JVC

SERVICE MANUAL

MODEL

KD-A22 A/B/C/E/J/U

STEREO CASSETTE DECK

No. 4191
May 1980

Contents

Specification

Type : Stereo cassette deck
Track system : 4-track, 2-channel
Tape speed : 1-7/8 inch/sec (4.8 cm/sec)
Frequency response:
(0 VU recording)
Metal tape *1 ; 40–11,000 Hz (±3 dB)
SA/Chrome tape *2 ; 40–8,000 Hz (±3 dB)
SF/Normal tape *3 ; 40–8,000 Hz (±3 dB)
(–20 VU recording)
Metal tape *1 ; 30–16,000 Hz
40–15,000 Hz (±3 dB)
SA/Chrome tape *2 ; 30–16,000 Hz
40–15,000 Hz (±3 dB)
SF/Normal tape *3 ; 30–15,000 Hz
40–14,000 Hz (±3 dB)
Surpasses DIN 45 500.
Note: *1 . . . SCOTCH METAFINE or Equivalent
*2 . . . TDK SA or Equivalent
*3 . . . MAXELL UD or Equivalent
S/N ratio : 60 dB (from peak level, weighted, Metal tape)
The S/N is improved by 5 dB at 1 kHz and by 10 dB above 5 kHz with ANRS on.
(DIN 45 500 weighted)
Effect of Super ANRS: (normal tape)
Improvement of S/N: the same as with ANRS
Improvement of frequency response:
0 VU recording; 6 dB at 10 kHz
+5 VU recording; 12 dB at 10 kHz
Improvement of distortion:
0 VU recording; 3% or less at 10 kHz
+5 VU recording; 3% or less at 10 kHz
Wow and flutter : 0.05% (WRMS),
0.15% (DIN 45 500)
Crosstalk : 65 dB (1 kHz)
Harmonic distortion: K3; 0.5%, THD; 1.0%
(metal tape, 1 kHz 0 VU)

Bias : AC bias
Erasure : AC erasure
Heads : 2 heads
METAPERM head for recording/playback and 2-gap ferrite head for erasure
Motor : Electronic governed DC motor
Fast Forward time : 95 sec. with C-60 cassette
Rewind time : 95 sec. with C-60 cassette
Semiconductors : 5 ICs, 20 transistors, 22 diodes, 7 LEDs, 1 SCR
Input terminals :
Mic jack x 2 ; Max. sensitivity; 0.2 mV (–72 dBs)
Matching impedance; 600 Ω – 10 kΩ
Input jack x 2 ; Min. input level; 80 mV (–20 dBs)
Input impedance; 100 kΩ
Output terminals :
Output jack x 2 ; Output level; 300 mV
Output impedance; 5 kΩ
Phones jack x 1 ; Output level; 0.3 mW
Matching impedance; 8 Ω – 1 kΩ
DIN socket : Min. input level; 0.1 mV/kΩ
Input impedance; 10 kΩ
Output level; 300 mV
Output impedance; 5 kΩ
Power requirement : AC 240 V, 50 Hz (KD-A22A)
AC 240/220/120 V, 50/60 Hz (KD-A22B/C/E/J)
AC 240/220/120/100 V, 50/60 Hz (KD-A22U)
Power consumption: 11 W
Dimensions : 16-1/2" (420 mm) W
5-1/4" (134 mm) H
10-3/8" (264 mm) D
Weight : 9.9 lbs (4.5 kg)

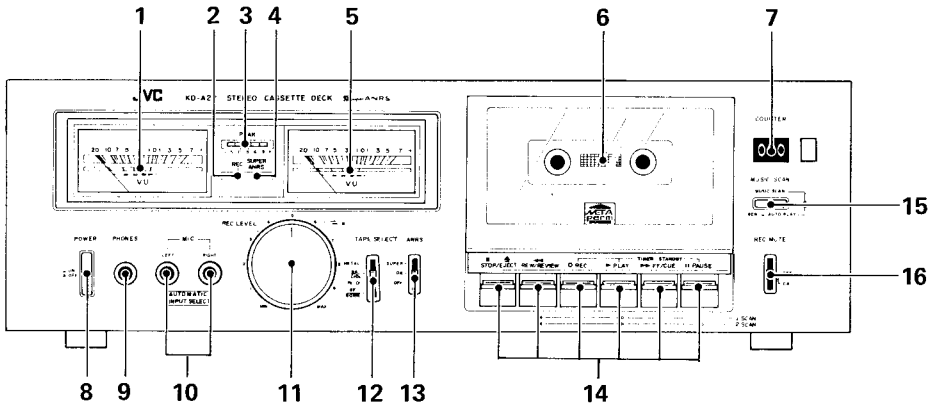
Design and specifications are subject to change without notice.

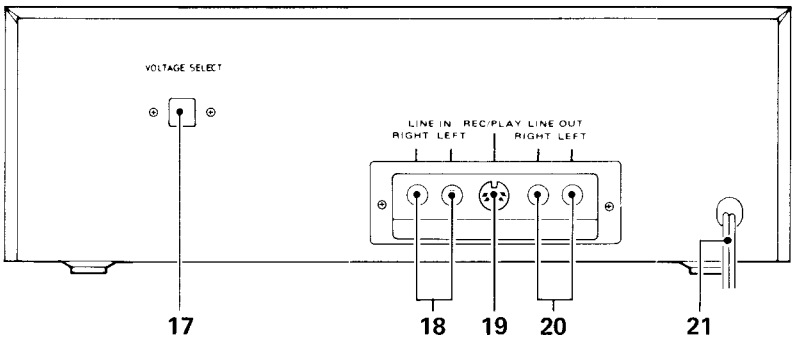
No. 4191

Features

- Single lever 4-stage tape select switch makes the KD-A22 compatible with all types of tape including the new metal tape format.
- Music SCAN (Automatic program selection mechanism)
- Automatic playback after rewinding.
- ANRS and Super ANRS greatly reduce tape hiss-noise and improve linearity at high frequencies.
- 5-LED multi-point peak level indicator facilitates the adjustment of the recording level.
- METAPERM head for recording/playback.; 2 Gap ferrite head for erasure.
- REC MUTE switch, convenient for leaving a non-recorded section on the tape between programs.
- Timer recording and playback available.
- Tape amount indicator
- Automatic input selection.
- FF/CUE and REW/REVIEW.
- New large VU meters with back light indicator.

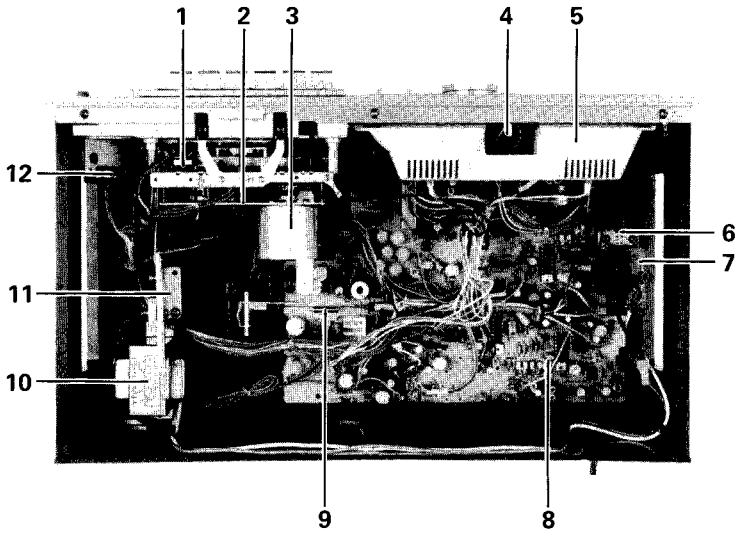
Controls and Connections



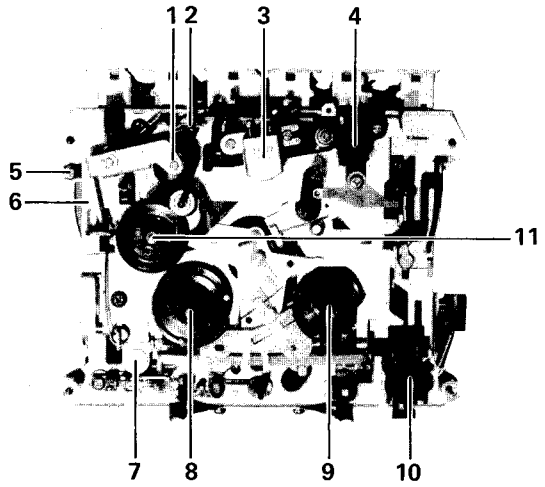


1. Left channel VU meter
2. Record indicator (REC)
3. Multi-point peak level indicators
4. Super ANRS indicator
5. Right channel VU meter
6. Cassette holder
7. Tape COUNTER/counter RESET button
8. POWER switch
9. PHONES jack
10. MIC jacks
11. REC LEVEL controls (forward knob – Left channel; rearward knob – Right channel)
12. TAPE SELECT switch
13. ANRS switch
14. Cassette operation buttons
    - ■ STOP/⏏ EJECT button
    - ◀◀ REW/REVIEW (Rewind/review) button
    - ○ REC (Record) button
    - ▶ PLAY button
    - ▶▶ FF/CUE (Fast forward/cue) button
    - II PAUSE button
15. MUSIC SCAN (Automatic program select) switch
16. REC MUTE (Record muting) switch
17. Voltage select switch (KD-A22B/C/E/J/U)
18. LINE IN terminals
19. DIN (REC/PLAY) socket
20. LINE OUT terminals
21. Power cord

Main Parts Location

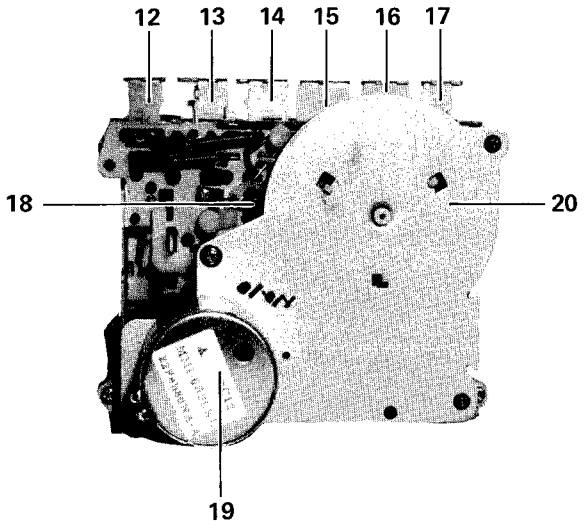


1. Flywheel/capstan belt
2. Automatic stop solenoid
3. Motor
4. Multi-point peak level indicators P.W. board ass'y
5. Meter cover
6. Remote bar for power switch
7. Power switch P.W. board ass'y
8. Main amp P.W. board ass'y
9. Recording spring
10. Power transformer
11. Oiled-gear damper ass'y
12. Reed switch P.W. board ass'y



(Mechanical parts)

1. Pinch roller arm ass'y
2. Pinch roller spring
3. REC/PB head
4. Erase head
5. Pause switch
6. Flywheel
7. Motor switch
8. Take-up reel disk ass'y
9. Supply reel disk ass'y
10. Recording safety lever
11. Take-up idler ass'y



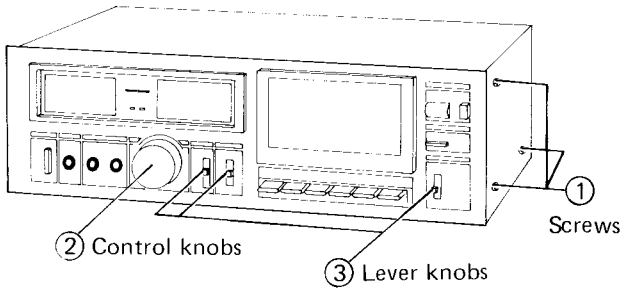
12. Stop/Eject bar ass'y
13. Rewind/Review bar ass'y
14. Recording bar ass'y
15. Play bar ass'y
16. Fast-forward/Cue ass'y
17. Pause bar ass'y
18. Muting switch
19. Motor
20. Flywheel/Motor bracket

Removal of the main parts

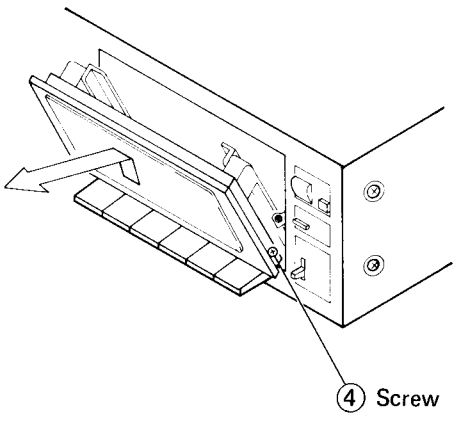
Observe care in handling the parts since the parts are small in size and the distance between them are short due to a deck design aimed mainly at compactness and high performance.

Enclosure assembly parts

1. Top cover
   Remove 6 screws ① fastening the top cover.
   (left and right – 3 screws on each)
2. Knobs
   REC LEVEL control knobs ②
   TAPE SELECT, ANRS and REC MUTE lever knobs ③
   — Pull off the front side.

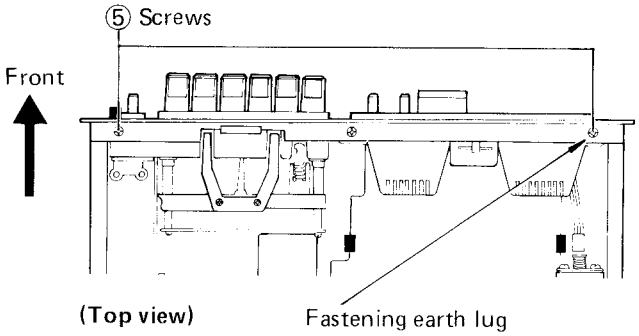


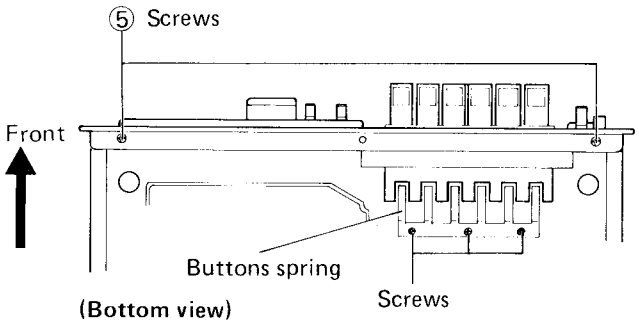
3. Cassette lid
   1) To open the cassette lid, push on the STOP/EJECT button.
   2) Remove a screw ④ fastening the cassette lid (its right lower side).
      Be careful of holding a nut.
   3) Pull off the cassette lid to upper side.



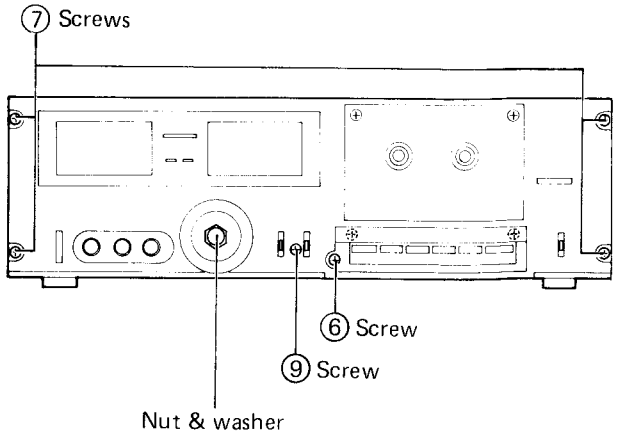
4. Bottom cover
   Remove 3 screws fastening the bottom cover (center screw is long size) and remove the bottom cover from 3 pawls of rear side.
5. Buttons spring
   Remove 3 screws fastening the buttons spring.

6. Front plate assembly
   Remove 3 screws (upper side) and 2 screws (lower side) ⑤ fastening the front plate assembly, and then pull off it to front side (left up side screw fastens same as the earth lug).



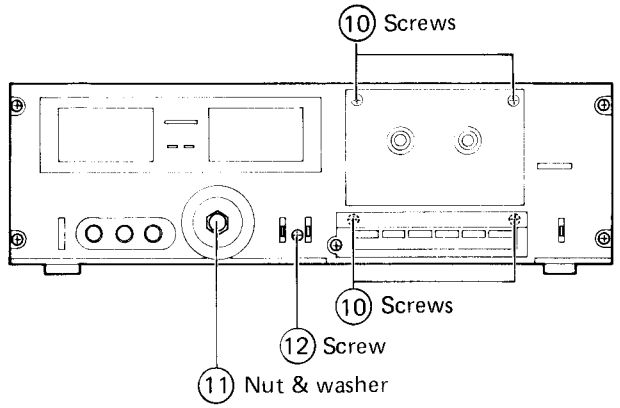


7. Front panel assembly
   1) Remove a screw ⑥ fastening the button escutcheon (left side).
   2) Open the cassette holder, and remove a screw fastening the operation button assembly, then remove it.
   3) Remove 4 screws ⑦ fastening the front panel.
   4) Remove nut and washer ⑧ fastening variable resistor for recording level control.
   5) Remove a screw ⑨ fastening the lever switch of main P.W. B. assembly.



Mechanical assembly

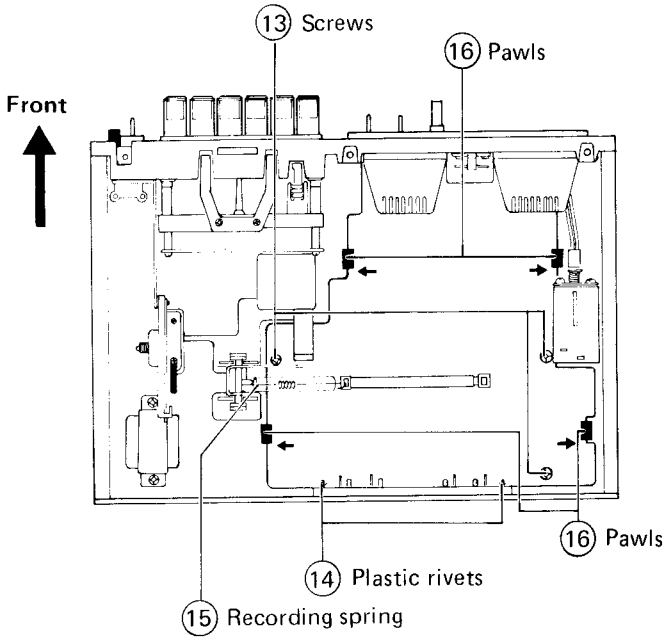
1) Remove the counter belt from counter pulley.
2) Remove 4 screws (10) fastening the front panel.



Note: When removing the mechanical assembly as not removed the front panel, do the following method.
1) Remove the control plate of the button escutcheon.
2) Remove 4 screws (10). When doing this method, the control plate can not use again. (It needs a new parts.)

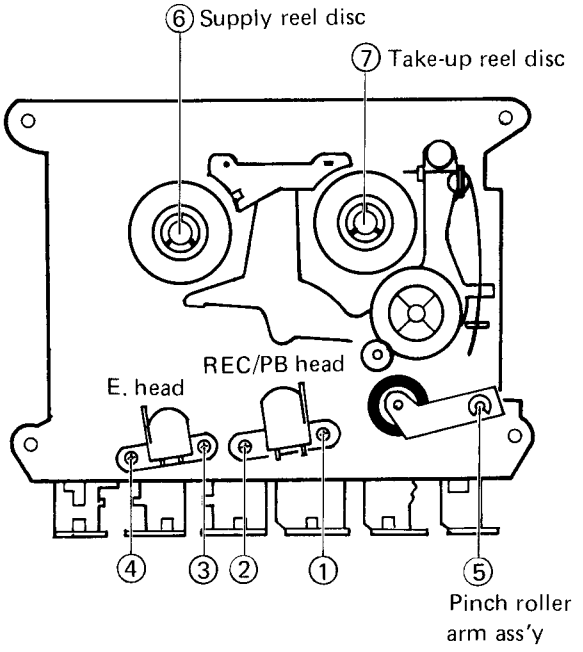
Electrical parts (Main amp P.W.B. assembly)

1) Remove a nut and washer (11) fastening the variable resistor for recording level control.
2) Remove a screw (12) fastening the level switch.
3) Remove 3 screws (13) fastening the main amp P.W.B. assembly.
4) Remove 2 plastic rivet (14) fastening the PIN jack assembly.
5) Remove the recording spring.
6) Remove 4 pawls (16) of main amp. P.W.B.



Mechanical parts

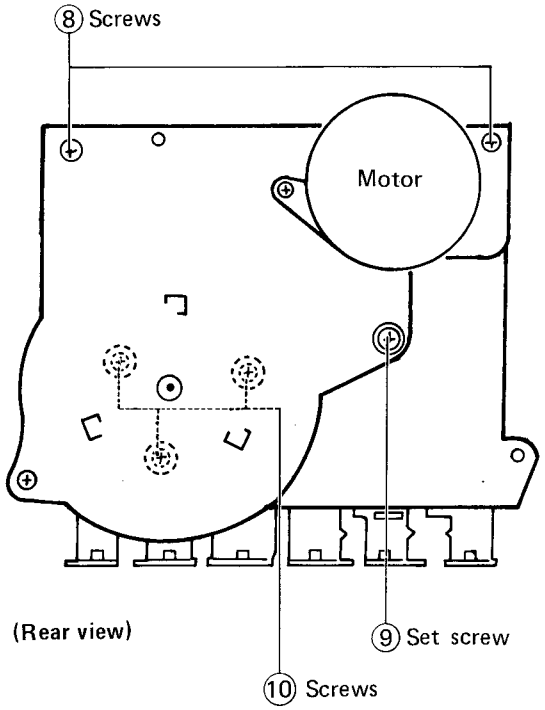
1. REC/PB head
   (Remove a screw (1).
   Work loose a screw (2) for adjustment.)
2. Erase head
   (Remove a screw (3).
   Remove a screw (4) for adjustment.)
3. Pinch roller arm ass'y
   (Remove an E-ring (5) holding its assembly.
   Pull it off from the shaft.)
4. Supply reel disc assembly
   Pull out the reel disc stopper (6) and remove its disc from the shaft.
5. Take-up reel disc
   Pull out the reel disc stopper (7) and remove the counter belt, pull out its disc from the shaft.



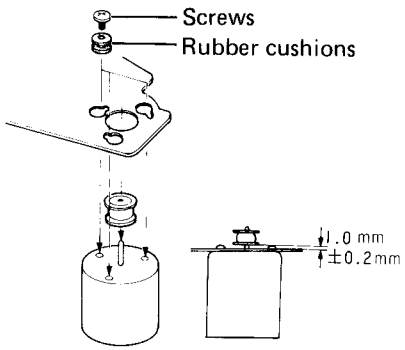
Note: 1) Remove the reel disc stoppers with a piece of sheet metal inserted between the reel disc and stopper, when assembling the reel disc, the stopper needs a new parts (the stopper cannot use again).
2) Be careful not to stain the counter belt.

6. Flywheel assembly
   1) Remove 3 screws ⑧ and a set screw ⑨ fastening the flywheel bracket.
   2) Remove the capstan belt.
   3) Remove 3 screws ⑩ fastening the capstan metal.
   4) Remove the lock bushing (pressure insertion), the take-up spring and the take-up idler arm ass'y.
   5) Remove the stopper cover (pressure insertion). To remove the gear base tip from the capstan metal groove, move the gear base to supply reel disc direction.
   6) Pull off the flywheel assembly.

   Note: When assembling the flywheel, fasten the screws it after assembled the capstan metal groove to the chassis pawls.

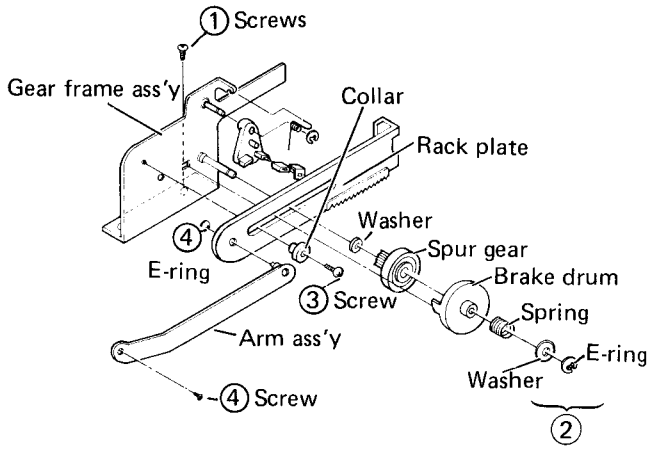


7. Capstan motor
   1) Remove a screw fastening the rubber stopper.
   2) Remove the capstan belt from the motor pulley.
   3) To remove the motor, turn it in counterclockwise direction and pull it out backward (with 3 cushions and 3 screws for fastening the motor).



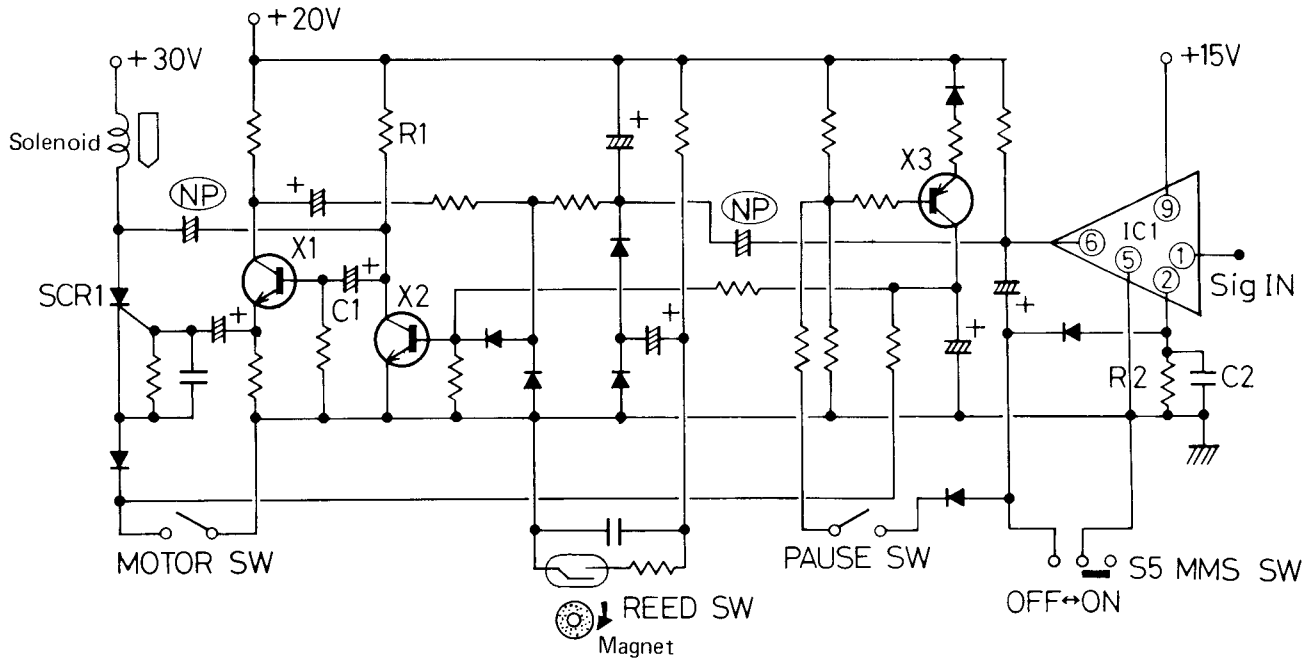
Note: When replacing the motor, check the following points.
   1) Is the motor placed in correct position? (Don't make the motor's position deflective.)
   2) Does the capstan belt run in the center of the motor pulley?

8. Oiled-gear damper
   1) Gear frame ass'y ..... Remove a screw ①.
   2) Spur gear and brake drum ..... Remove an E-ring, a washer and a spring ②.
   3) Rack plate ..... Remove a screw and a collar ③.
   4) Arm assembly ..... Remove an E-ring and a screw (cassette holder side).



On Auto-Selection

(Description of Technology Employed in the KD-A22)



1. Outline

1) The start of the next cut or the cut being played can be located by simultaneously pressing the FF and PLAY buttons or the REW and PLAY buttons.
2) The start of the cut following the next or the former cut can be located by pressing the PAUSE button in additon to the above operation.
3) Further, after the PAUSE button is released the selection of the desired cut is completed, re-pressing the PAUSE button enables the start of the third cut to be located.

NOTE: Selection of a number of cuts is possible by replacing the above operation in entirety.

2. Operting Principles

1) Auto-stop opertation

Since the magnet also rotates when the tape is rotating, the reed switch repeats an ON-OFF operation. The current change due to this ON-OFF operation is rectified by the diode to make the voltage level at the base of X2 "H" level turning X2 on.

When the magnet stops rotating, the voltage level at the base of X2 becomes "L" level and thus X2 goes off.

At this time, X1 is in the ON state during only the period determined by the time constant of C1 and R1 to turn SCR1 on, thus resulting in the operation of the solenoid. Subsequently, X1 goes off. When the collector voltage of X1 increases, a voltage is applied to the base of X2 and thus X2 goes on again.

2) Music scan

When performing music scan, the RECORD/PLAYBACK head detects signals from its contact with the tape.

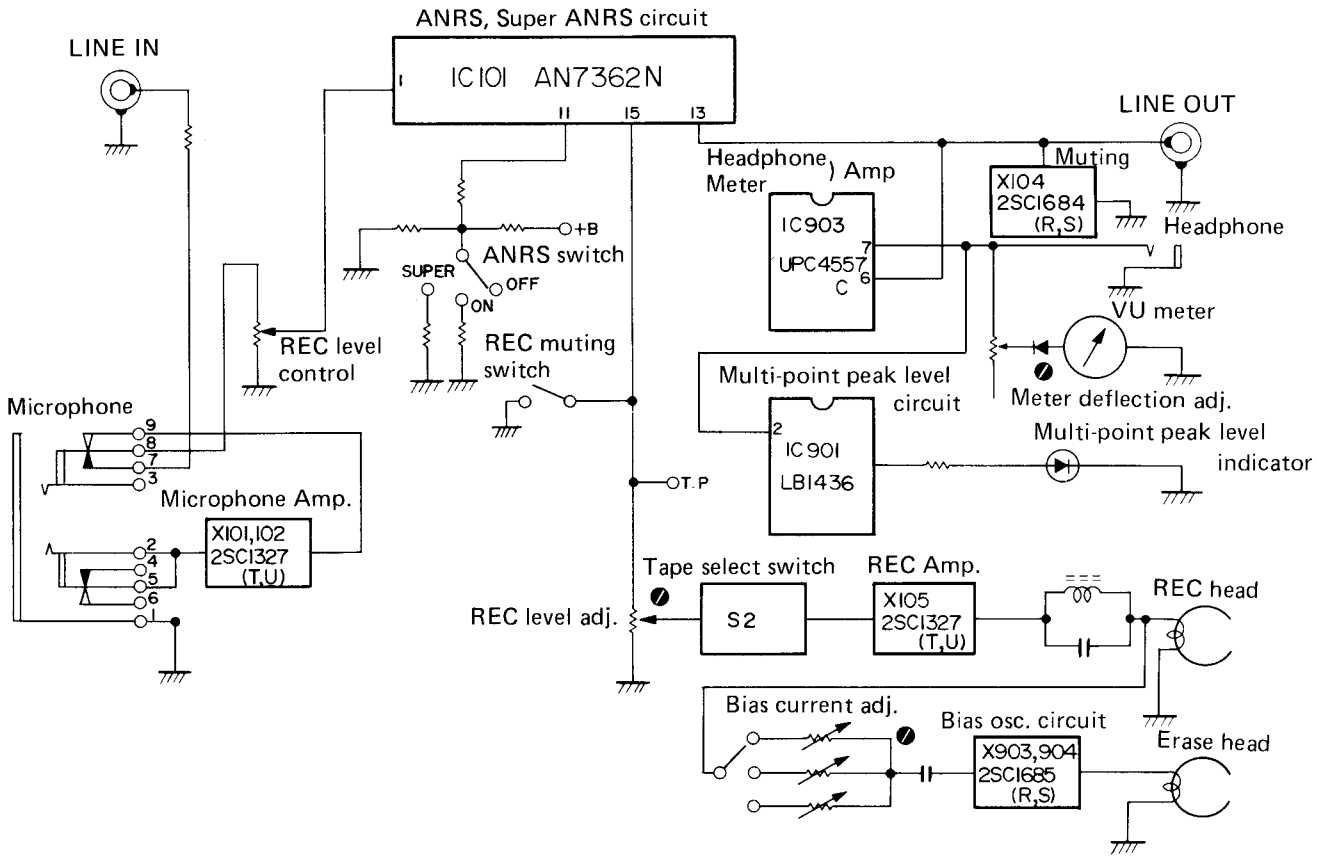
A detected signal is entered at pin 1 of IC1. At this time, the voltage level of pin 2 of IC1 becomes "H" level and also that at pin 6 of IC1 becomes "H" level.

When the first head detects the non-recorded section, the voltage level at pin 6 of IC1 becomes "L" level during the delay of the time constant of R3 and C3 to pull the base of X2 to turn X2 off. Thus, the auto-stop circuit operates to complete the music scan.

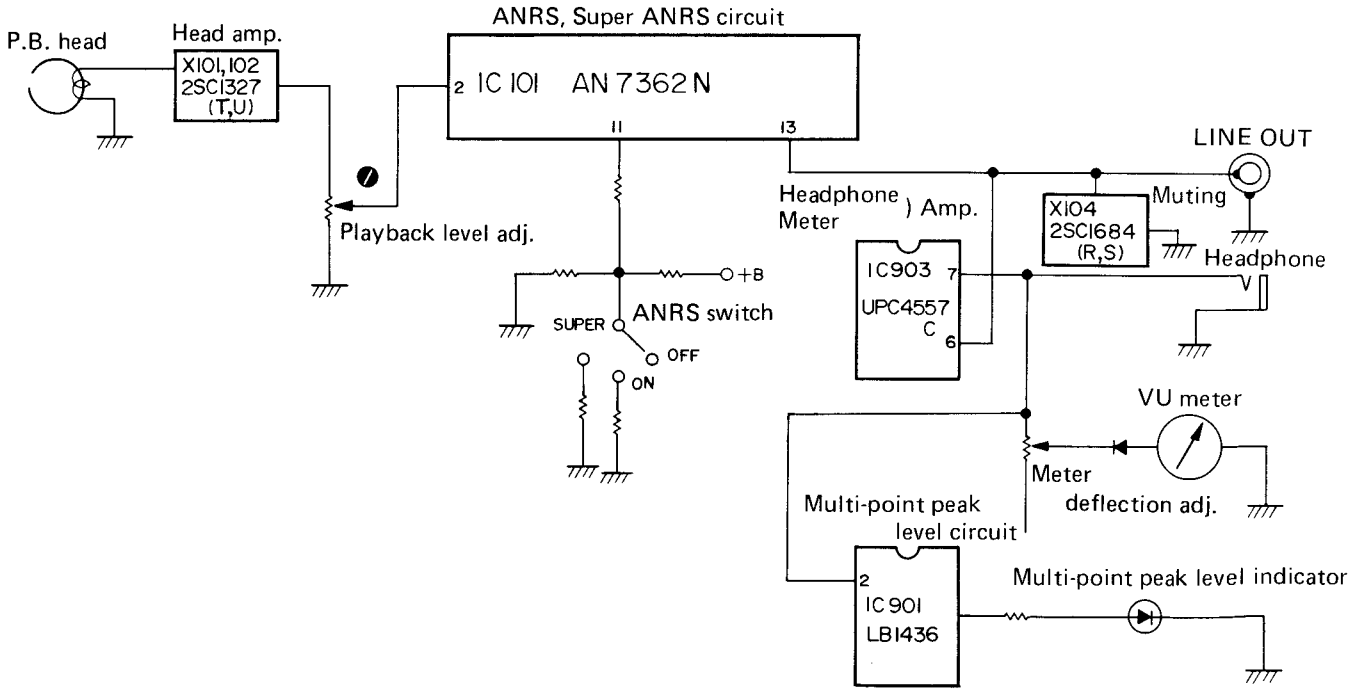
NOTE: At the −50 dB $^{+7}_{-4}$ dB signal input level at pin 1 of IC1 with respect to an input signal of 1 kHz, the voltage level of pin 6 of IC1 is switched from "L" to "H" or vice versa.

Block Diagram

Recording System



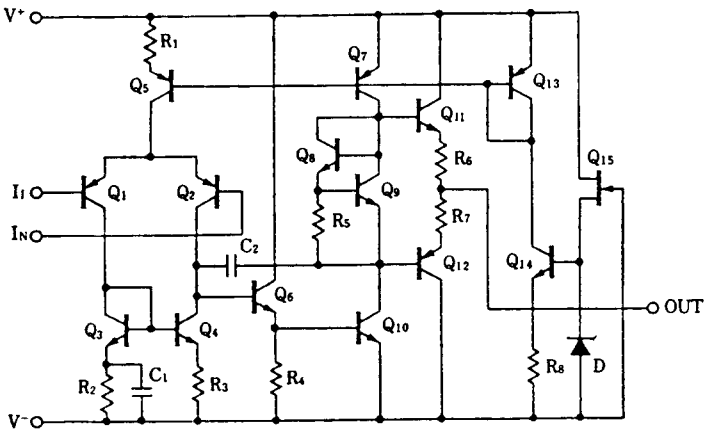
Playback System



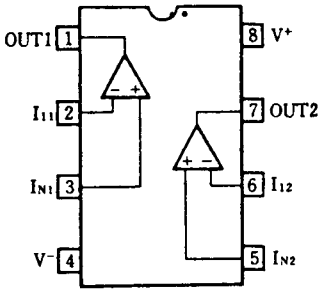
Integrant Circuit

•IC-903 UPC4557C Headphone & Meter Amp.

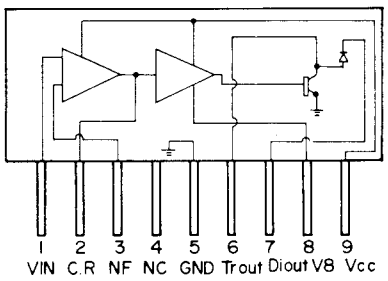
Equivalent Circuit 1/2

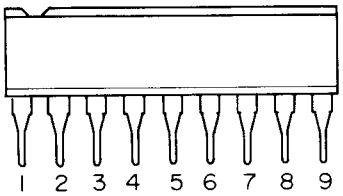


(Top view)

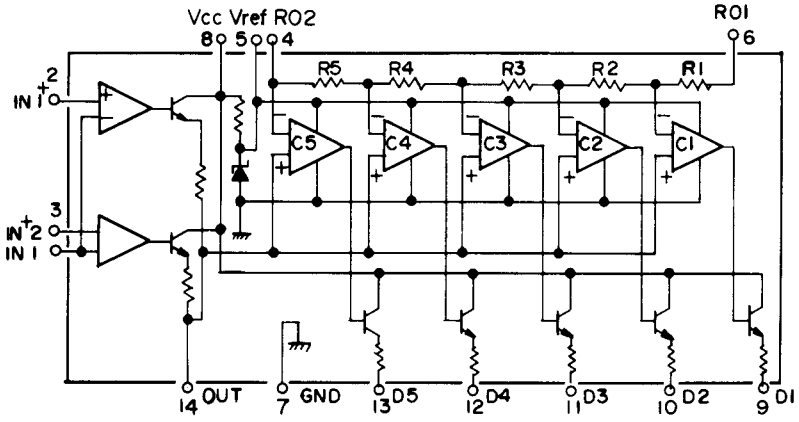


•IC-902 BA335 Music scan

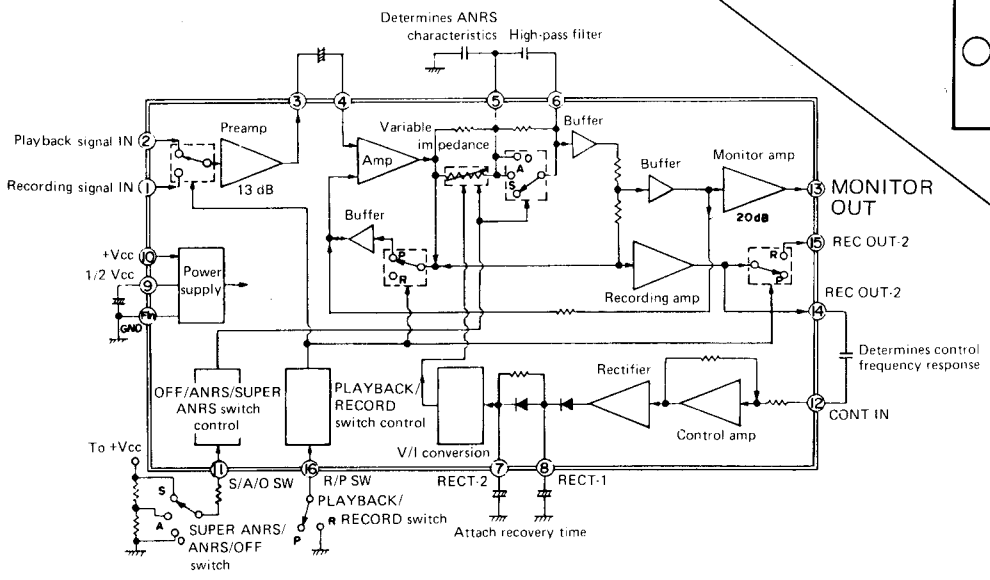




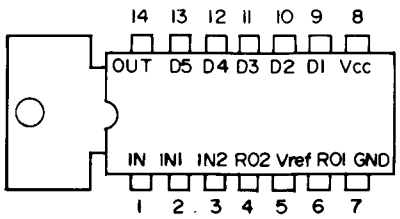
•IC-901 LB1436 Multi-point Peak Level Circuit



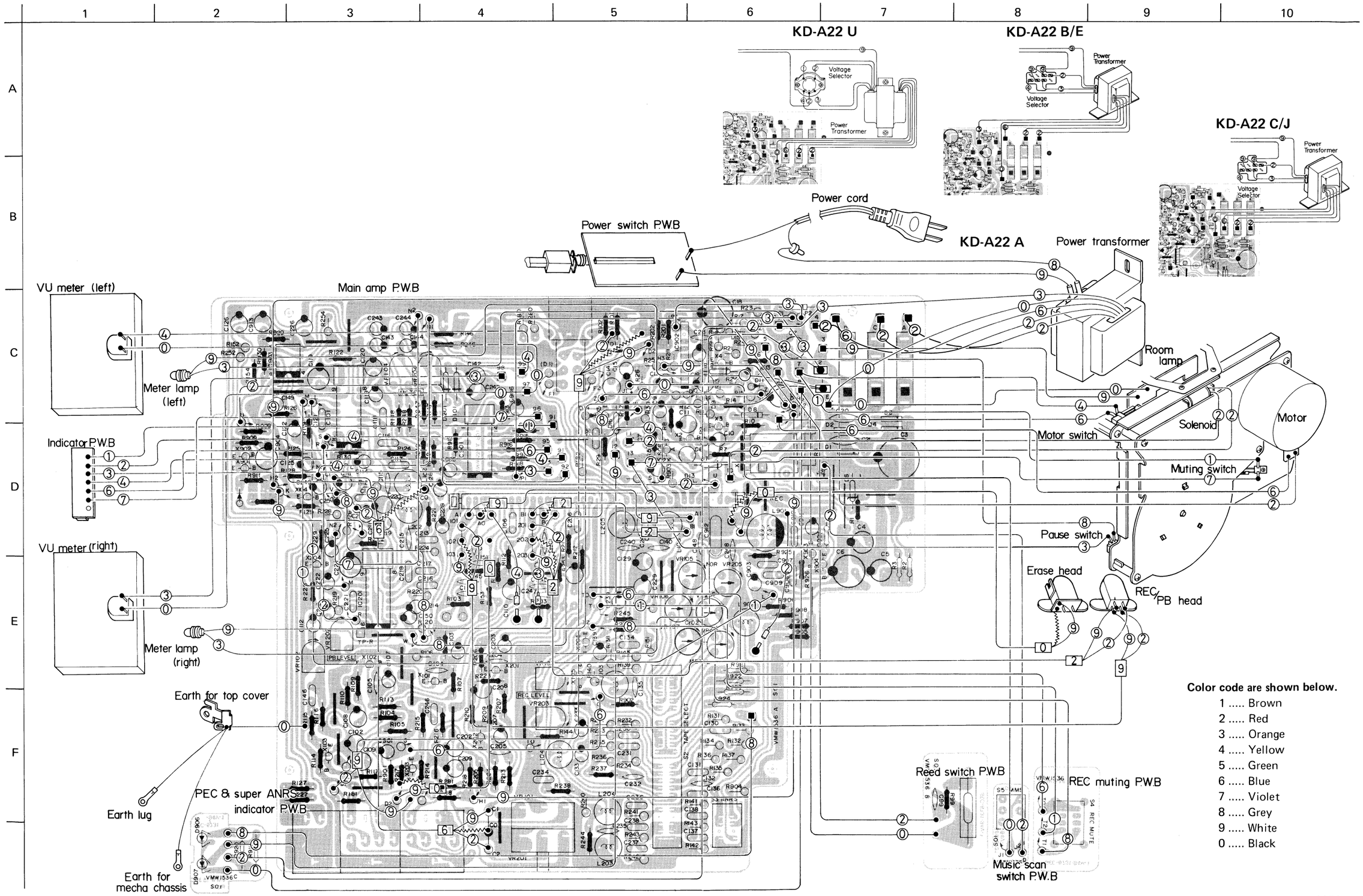
•IC-101 AN7362N ANRS, Super ANRS (Block diagram) 201



(Top view)



Wiring Connection

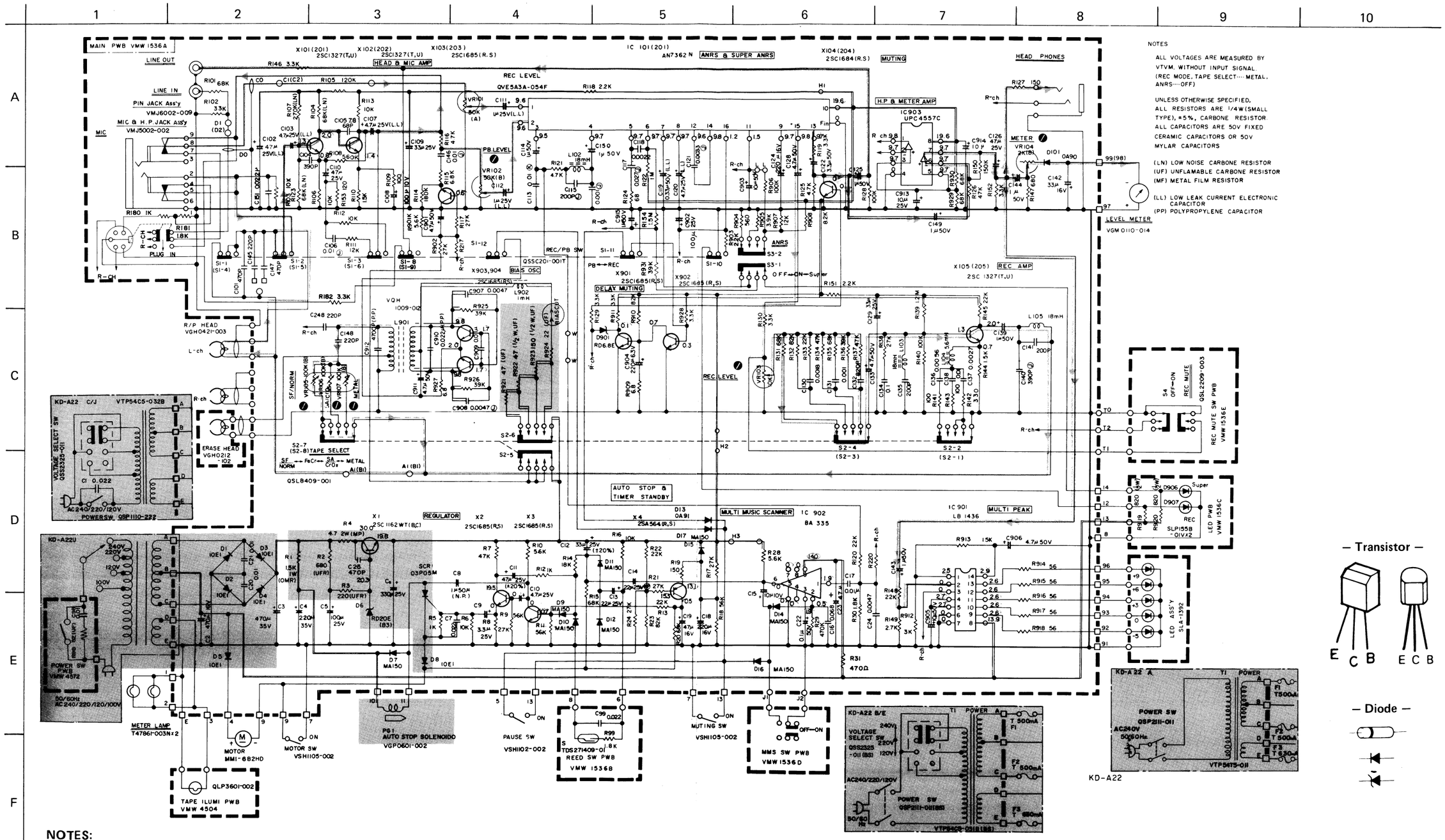


Color code are shown below.

1 ..... Brown
2 ..... Red
3 ..... Orange
4 ..... Yellow
5 ..... Green
6 ..... Blue
7 ..... Violet
8 ..... Grey
9 ..... White
0 ..... Black

No. 4191

Standard Schematic Diagram of KD-A22



NOTES

ALL VOLTAGES ARE MEASURED BY VTVM, WITHOUT INPUT SIGNAL. (REC MODE, TAPE SELECT····METAL, ANRS····OFF)

UNLESS OTHERWISE SPECIFIED, ALL RESISTORS ARE 1/4W(SMALL TYPE), ±5%, CARBONE RESISTOR
ALL CAPACITORS ARE 50V FIXED CERAMIC CAPACITORS OR 50V MYLAR CAPACITORS

(LN) LOW NOISE CARBONE RESISTOR
(UF) UNFLAMABLE CARBONE RESISTOR
(MF) METAL FILM RESISTOR

(LL) LOW LEAK CURRENT ELECTRONIC CAPACITOR
(PP) POLYPROPYLENE CAPACITOR

NOTES:

All voltages are measured by E. Voltmeter, without input signal.
(Rec mode, tape select ..... metal, ANRS ..... OFF)

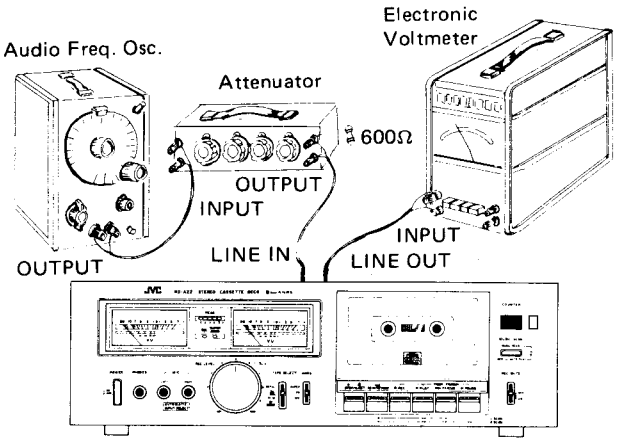
1. Unless otherwise specified, all resistors are 1/4 W, ± 5% carbon resistors.
   And all capacitors are 50 V fixed ceramic capacitors or 50 V Mylar capacitors.
2. UF — Unflammable carbon resistor
   MF — Metal film resistor
   OMF — Oxided metal film resistor
   Ta — Tantalum solid electrolytic capacitor
   LL — +20% low leak current electrolytic capacitor
   PP — Polypropylene capacitor
   PS — Polystyrene capacitor
   MM — Metallized mylar capacitor
   NP — Non-polarized electrolytic capacitor
   MP — Metallized polyester film capacitor
3. Blue line shows the signal at playback.
   Red line shows the signal at recording and +B circuits.
4. ▬ parts are safety assurance parts. When replacing those parts, make sure to use the specified one.

Main Adjustments

[I] Equipment and measuring instruments used for adjustment

1. Electrical adjustment

1) Electronic voltmeter
2) Audio frequency oscillator
   (range: 50—20 kHz and output 0 dB with impedance 600 Ω)
3) Attenuator
4) Standard tapes for REC/PB
   Maxell UD — SF tape
   TDK SA — SA tape
   SCOTCH METAFINE — Metal tape
   } or equivalent
5) Reference tapes for playback (JVC Test Tape)
   VTT-658 (for head azimuth adj.)
   VTT-656 (for tape speed, wow flutter adj.)
   VTT-664 (for Reference level 1 kHz)
   VTT-675N (for playback frequency response)
   TMT-6247 (for music scan)
   TMT-6237 (for music scan)
6) Resistors
   100 Ω (for measurement of the bias current)
   600 Ω (for attenuator matching)



KD-A22

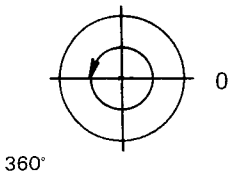
2. Mechanical adjustment

1) Gauge for checking the head position.
2) Torque gauge
3) Blank tape (C-120) for tape running checker.
4) Band base filter

[II] Adjustment and repair of the mechanism

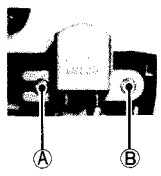
Tape-to-head contract adjustment

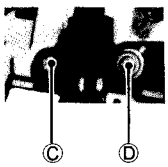
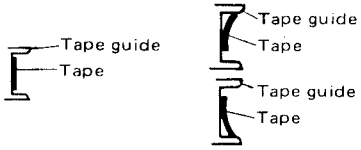
1) Turn the adjusting screw ⓒ for aligning the erase head until it stops. Then, turn the screw in the reverse direction by 360°.



2) Check the tape-to-head contact using a C-120 tape having pads.
3) Check it again with a Metal tape.
   Checking method:
   Record a 400 Hz or 1 kHz signal with 0 VU + 20 dB. Erase the recording. Checking if the erasing is satisfactorily performed.
4) After adjustment, apply screw bond on the adjusting screw to prevent its loosening.

(Adjust the mechanism or confirm that it is in normal operating condition prior to the adjustment of the electrical circuit.)

Item	Adjustment	Adjusting point	Standard value	Remarks
Adjusting record/playback head position 	1. Connect an electronic voltmeter to the LINE OUT terminals. 2. Play back the VTT-658 test tape. 3. Adjust the head angle with the screw Ⓐ until the reading of the electronic voltmeter becomes maximum for both channels. 4. After adjusting, set the screws (Ⓐ Ⓑ) with screw bond.	Screw Ⓐ	Maximum	If the head is worn, disconnected or exceedingly magnetized so as not to provide the necessary characteristics, replace it with a new one. After replacement, the head position adjustment as well as the playback level adjustment, the bias current adjustment and the recording level adjustment are all necessary. If the output difference between the left and right channels exceeds 3 — 4 dB, the head is defective. Replace it with a new one.

Item	Adjustment	Adjusting point	Standard value	Remarks
Adjusting erase head height 	Turn the adjusting screw Ⓓ for aligning the erase head until it stops. Employ a special cassette (C-120) from which parts of the casing, where the erase head, record/playback head and capstan engage, has been cut away. Perform tape transport with the cassette tape. Adjust the screw Ⓒ until the tape runs in the center of the erase head tape guide. (See "Troubleshooting hints" aforesaid.) Correct / Incorrect  After adjustment, set the screws (Ⓒ, Ⓓ) with screw bond.	Screw Ⓒ		Be sure to perform this adjustment after replacing the erase head.
Adjusting motor speed	Connect a speed meter (an electronic counter) to the LINE OUT terminals. Play back the VTT-656 test tape. Adjust the semi-fixed resistor in the motor until the reading of the speed meter is 3000 Hz.	Semi-fixed resistor in the motor	3000 Hz	If the speed meter functions as a wow and flutter meter, also, connect the deck to the INPUT terminals of the meter.
Checking playback torque	Employ a torque testing cassette tape for the checking, or remove the cassette cover and use a torque gauge.		40–70 gr-cm	If the standard torque is not obtained, replace the take-up disc assembly.
Checking fast forward torque	Measure the torque in the fast forward mode in the same manner as in the above.		More than 70 gr-cm	If the standard torque is not obtained, perform the following. 1. Clean the capstan belt, the idler circumference, the motor pulley, the take-up reel disc circumference, the flywheel circumference, etc. 2. Replace the belt and idler.
Checking rewind torque	Measure the torque in the rewind mode in the same manner as in the above.		More than 70 gr-cm	If the standard torque is not obtained, clean the capstan belt, idler, motor pulley, flywheel circumference, rewinding idler circumference, left reel disc circumference, etc.
Checking wow and flutter	Connect a wow and flutter meter to LINE OUT terminals. Play back the VTT-656 test tape. Check to see if the reading of the meter is within 0.06% (WRMS).			If the reading becomes moving value even if conforming to the standard, a re-claim may be raised. Repairs are necessary.
Checking the MUSIC SCAN (automatic program selection facility)	When playing the TMT-6247 with music scan switch "ON". 1) To listen to the present program from its beginning. Press the REW/REVIEW and PLAY buttons at the same time. The tape automatically plays at the beginning of the program, and playback restarts. 2) To listen to the previous program. Press the PAUSE button, then press the REW/REVIEW and PLAY buttons at the same time. The tape is rewound to the left. The PAUSE button is automatically released when the tape reaches the beginning of the present program, however, the tape transport continues. The tape automatically plays at the beginning of the program to be listened and the playback starts after the REW/REVIEW button is released. When playing the TMT-6237, check to not MUSIC SCAN operations.			
Checking the automatic playback with after rewind mode	When running the tape finish with MUSIC SCAN switch "OFF", check to automatic playback after rewinding.			

[III] Repair of wow flutter

If wow and flutter increase, check the following points. If there is defect in revolving parts, the wow and flutter generated will increase in proportion to the number of revolutions.

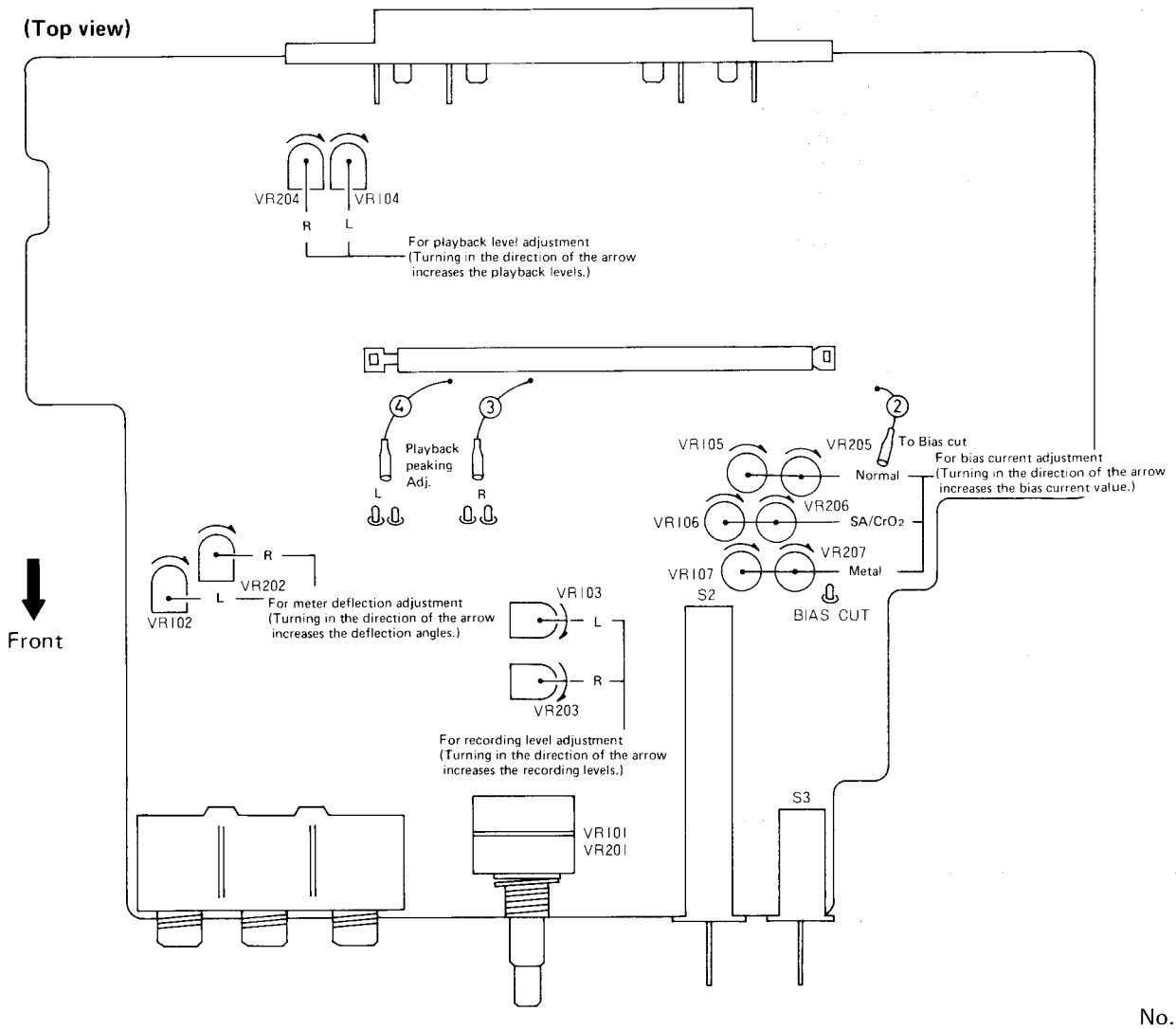
Play a 3000 Hz Reference tape, and defective part can be detected from the sound.

Section	Trouble	Repair
Capstan and flywheel	Capstan shaft has excessive run-out. Flywheel turns heavily. (shaft seisure, thrust play, etc.)	Replace flywheel. Clean the capstan shaft and the groove in the flywheel. Apply oil to the metal position. Replace the capstan assembly.
Pinch roller	Rough rotation (Deformation scratches, or dust)	Replace pinch roller, or pinch roller spring. Clean the pinch roller or apply oil to the rotary shaft.
Belt	Belt has undue run-out. Belt is dirty or slippery.	Clean the belt. Replace the belt.
Back tension	Back tension is irregular, or back tension is too strong.	Replace back tension spring (under supply disc).
Motor	Motor shaft has undue run-out. Motor pulley is oily and dusty.	Replace the motor. Clean the motor pulley.

[IV] Electrical adjustments location

Main Amp. P.W. Board assembly

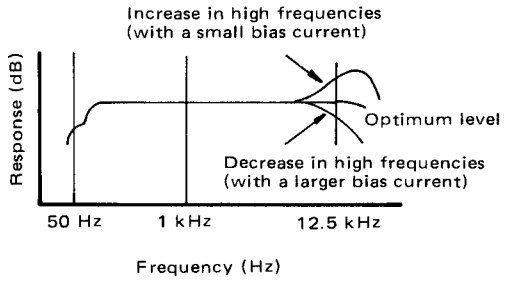
(Top view)

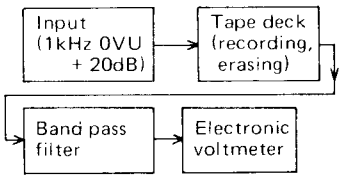


[V] Electrical circuit adjustment procedure

In the steps marked by an asterisk (*), adjustment should be performed, however, only checking is sufficient with steps other than those.

Adjustment should be performed in the order of steps 1, 2, 3, . . . Perform this adjustment with the ANRS switch set to OFF.

Step	Item	Adjustment	Adjusting point	Standard value	Remarks
1*	Adjusting playback level	1. Play back the VTT-664 Reference tape (1 kHz) with the tape select switch set to the SF/NORM position. 2. Adjust VR102 and VR202 until the LINE OUT becomes about −8 dBs.	VR102, 202	−8 dBs (0.3 V)	This adjustment becomes necessary when a change in playback level results (for example, due to head replacement).
2*	Playback frequency response	Playback test tape VTT-675N (1 kHz, 10 kHz) for following adjustment. 1) Adjust Playback peaking so that 10 kHz signal and 1 kHz signal gains become flat response.		Reference frequency: 1 kHz 0 ± 2 dB at 10 kHz	ANRS: OFF TAPE SELECT: SF/NORM
3*	Adjusting VU meter deflection	1. Set the cassette deck to its recording mode. 2. Apply a 1 kHz, approx. −10 dBs signal to the LINE IN terminals. 3. Adjust the recording level controls until the signal is available at −8 dBs at the LINE OUT terminals. 4. Adjust VR104 and VR204 until the VU meters deflect to 0.	VR104 204	0 VU	Perform the adjustment when the parts are replaced.
4*	Checking record/playback frequency response	Record 1 kHz, 50 Hz and 12.5 kHz signals at an input level of 0 VU to −20 dB. Play back the tape. Check to see that the 50 Hz and 12.5 kHz signal output deviations fall within the standard range, using the 1 kHz signal output as a reference. VR105, 205 (NORMAL) VR106, 206 (CHROME) VR107, 207 (METAL)	For SF/NORM tape; VR105 205 For SA/CrO_2 tape; VR106 206 For Metal tape; VR107 207	Reference frequency; 1 kHz 0 ± 3 dB at 50 Hz 0 ± 3 dB at 12.5 kHz	This checking should be performed for normal, chrome and metal tapes and for both right and left channels. 1. Bias current adjustment for a cassette deck should generally be performed referring to the record/playback frequency response. This is because the frequency response of a cassette deck depends more greatly upon the bias current than does that of an open reel deck. 2. If the bias current is not properly adjusted, the record and playback characteristics become as shown left.
					
5	Adjusting recording level	1. Apply a 1 kHz, approx. −10 dB signal to the LINE IN terminals. Adjust the recording level controls until the signal is available at −8 dBs at the LINE OUT terminals. 2. After checking to see if the VU meters become to 0, record the signal applied to both left and right channels using normal tape. 3. Play back the recording part. Perform the recording signal adjustment with VR103 and 203 so that the VU indicator become to 0.	VR102 203	0 VU	The level difference between left and right channels for SF/NORM tape should be less than 1 dB (1 VU). Perform the adjustment using a normal tape, level difference between metal tapes should be less than 1.5 dB, and that between left and right channels should also be less than 1 dB.

Step	Item	Adjustment	Adjusting point	Standard value	Remarks
6	Checking record/playback signal distortion	1. Record a 1 kHz, −8 dBs signal to LINE OUT terminals and perform recording with the VU meter becomes to 0. 2. Play back the recorded part. Check the output with a distortion meter to see if the value conforms to the standard value.		SF/NORM tape; Less than 1.2% SA/CrO_2 tape; Less than 3% Metal tape; Less than 2%	Be sure to perform this adjustment following bias current and recording level adjustments.
7	Checking signal to noise ratio in recording/playback	1. Record a 1 kHz, 0 VU signal. Stop the input by disconnecting from the terminal to perform non-signal recording. 2. Play back the recorded part. Measure the 0 VU recording output and the non-signal recording output for comparison using an electronic voltmeter. Check to see if the value conforms to the standard value.		SF/NORM, SA/CrO_2 and Metal tapes; More than 42 dB	Apply an input (−72 dBs) to the MIC terminals with the recording level controls set to maximum so that the VU meter becomes to 0.
8	Checking erasing coefficient	1. Apply a 1 kHz signal to the LINE IN terminals. Adjust the recording level controls until the VU meter becomes to 0. 2. Perform recording with the signal enhanced by 20 dB. 3. Erase a part of the recording. 4. Measure the output difference between the erased part and non-erased part to compare with an electronic voltmeter.		More than 65 dB	For the measuring, connect a band pass filter between the deck and the electronic voltmeter. 

Maintenance

To get long, trouble-free service, maintenance is important. Do not forget cleaning and demagnetizing.

Cleaning

After long use, the heads and tape part — capstan, pinch roller, etc. — will become dirty with dust or magnetic particles. Dirty heads cause imperfect erasing or high frequency drop-off. A dirty capstan and pinch roller will cause unstable tape speed, leading to increased wow and flutter. Always keep them clean by following the procedure below.

1. Heads

1) Push Eject button to open the cassette holder.
2) Use the head cleaning stick provided to wipe the surface where the tape comes into contact with the head. (It is effective to moisten the cotton with alcohol.)

2. Cleaning the pinch roller and capstan

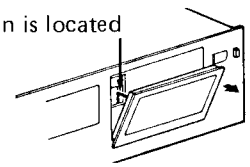
As the PLAY button cannot be pressed while the cassette holder is open, use the following procedure for cleaning. Put the power on, open the cassette holder and set the deck in the playback mode by pressing the cassette detection pin.

Notes: ○ Do not insert a cassette until the cleaned parts completely dry of alcohol.
○ Do not use thinner or benzine to clean the heads.

3. Cleaning the cabinet and panel

Wipe the cabinet and panel clean with a soft cloth dipped in a neutral cleaner. Do not use thinner, benzine, alcohol or other strong solvents, as these will cause damage to the surface finish of the cabinet and panel.

The cassette detection pin is located at this part inside.



Demagnetizing

The heads are made from a material resistant to magentization, but after long use they become magnetized.

A magnet brought into their vicinity can magnetize the heads, causing excess noise. If noise seems to have increased, demagnetize the heads with a head demagnetizer through the following procedure.

1. Turn the POWER switch OFF.
2. Wrap the tip of the demagnetizer with vinyl tape or soft cloth so as not to damage the head surface. Switch on the demagnetizer and bring it close to the head.
3. Move the tip of the demagnetizer slowly first to the left and right, then up and down in front of the head. Gradually move it away from the head and switch it off at a distance of more than 30 cm. (12")
4. The erase head need not be demagnetized. The capstan shaft and tape guide should be demagnetized in the same way as the record/playback head.

* Do not bring a magnetized metallic object (a screwdriver, for example) near the head as this will increase noise.

Enclosure Assembly and Electrical Parts

(Except P.W. Board Parts)

⚠ parts are safety assurance parts.
When replacing those parts, make sure to use the specified one.

Ref. No.	Parts No.	Parts Name	Remarks	Q'ty
(1~4, 7)	**ZCKDA22Y-CBF-1**	**Front Panel Ass'y**		**1 set**
1	VJC1108-001	Front Panel		1
2	VJD4162-001	Reel Disk Plate		1
3	VJK4105-003	Cassette Indicator		1
4	VYTN401-001	Sheet		1
5	VMW4504-001	P.W. Board		1
6	QLP3601-002	Lamp		1
7	VJD4369-001	Indicator Plate		1
8	VGM0110-014	Level Meter		2
9	VKS2109-001	Lamp Cover		1
10	VYH4315-002	Lamp Holder		2
11	T47861-003N	Lamp		2
12	VKL4697-001	Spring Bracket		1
13	VKW4119-001	Spring		1
14	VKC5135-001T	Counter		1
15	VXP3052-001	Mecha Button	Rec.	1
16	VXP3052-002	"	Stop	1
17	VXP3052-003	"		4
18	VKH4268-001	Shaft		1
19	VJD3221-001	Button Escutcheon		1
20	VJD4370-001	Control Plate		1
(21~22,26)	**ZCKDA22Y-CCA**	**Cassette Door Ass'y**		**1 set**
21	VJT3052-001	Cassette Lid		1
22	VJT3053-001	Lid Plate		1
23	VJT2041-001	Cassette Holder		1
24	VKY4178-001	Cassette Spring		1
25	VKY4178-002	"		1
26	VJD4009-001	Head Mark	Meta Parm	1
27	NNS2600S	Nut		1
28	VKL4698-00A	Arm Ass'y	C. Holder	1
(29~32)	**ZCKDA22Y-CBF-2**	**Front Plate Ass'y**		**1 set**
29	*VJC1107-002	Front Plate		1
30	VJD3222-001	Lever Escutcheon		1
31	VJD4371-001	Escutcheon		
32	VJK4120-001	Counter Lens		1
33	VKL4169-00A	Gear Frame Ass'y		1 set
34	VKS4236-001	Spur Gear		1
35	VKS4109-004	Brake Drum		1
36	VKW3001-006	Spring		1
37	VKS3102-001	Rack Plate		1
38	VKH4123-001	Collar		1
39	VKL4163-001	Rec. Arm (1)		1
40	VKH4121-001	Shaft		1
41	VKL4164-001	Rec. Arm (2)		1
42	VKH4121-002	Shaft		1
43	VKW4140-005	Record Spring		1
44	VXP4066-001	Push Button	Power	1
45	VKS4209-001	Remote Bar	"	1
46	VKY4111-002	Button Spring		1
47	VJF4003-001	Foot		4
48	VKL2123-001	Bottom Cover	VKL4291-002 = Shield Plate	1
49	VJC1109-001	Top Cover		1
50	VXL4124-00A	Knob Ass'y		1
51	VXL4125-00A	"		1
52	VXQ4030-001	Lever Knob		3
53	VXP4055-001	Knob	M.M.S.	1
54	VYN2062-002LA	Name Plate	KD-A22B	1
	VNN2062-003LA	"	KD-A22A	1
	" -004LA	"	KD-A22C	1
	" -005LA	"	KD-A22E	1
	" -006LA	"	KD-A22J	1
	" -007LA	"	KD-A22U	1
55	VYH1116-001	Amp Chassis		1

Ref. No.	Parts No.	Parts Name	Remarks	Q'ty
57 ⚠	QSP2111-011	Power Switch	KD-A22A/E	1
⚠	" -011BS	"	KD-A22B	1
⚠	QSP1110-222	"	KD-A22C/J	1
⚠	" -226	"	KD-A22U	1
58 ⚠	QFZ9008-223	M.P. Capacitor	for Power Switch KD-A22C	1
⚠	QFH72BM-223	M.M. Capacitor	" KD-A22J	1
⚠	QCZ9015-103	C. Capacitor	" KD-A22U	1
59 ⚠	T47047-001	Capacitor Boot	KD-A22C/J	1
60	VKZ4001-010	Wire Holder		1
61	VKL4194-001	Switch Bracket		1
62	VKY4181-001	Earth Lug	for Top Cover	1
63	VKL4167-001	Transformer Bracket		1
64 ⚠	VTP54T5-011B	Power Transformer	KD-A22A/E	1
⚠	" -031BBS	"	KD-A22B	1
⚠	" -031B	"	KD-A22C	1
⚠	" -032B	"	KD-A22J	1
⚠	VTP54U5-021	"	KD-A22U	1
65 ⚠	QMP2560-200	Power Cord	KD-A22A	1
⚠	QMP9017-008BS	"	KD-A22B	1
⚠	QMP1200-200	"	KD-A22C/J	1
⚠	QMP3900-2C0	"	KD-A22E	1
⚠	QMP7600-200	"	KD-A22U	1
66 ⚠	QHS3876-252	Strain Relief	KD-A22A/E	1
⚠	" -252BS	"	KD-A22B	1
⚠	QHS3056-252	"	KD-A22C/J/U	1
67 ⚠	TAW000504-01	Wire Connector	KD-A22C/J/U	1
68	E48729-003	Plastic Rivet	for Pin Jack	2
69	VKL4712-001	Switch Bracket	for Reed Switch	1
70	53492-002	Rubber Bushing		2
71	T30302-063	Collar		2
72 ⚠	SLA-1392	LED Ass'y	for Multi Peak	1
73	VMW1536-101E	P.W. Board	for Rec. Mute	1
74	QSL2209-003	Lever Switch	"	1
75	50242-2	Lug	for Mecha Earth	1
76	TFB313563-02	Plate Nut	for Front Plate	3
77	VMW1536-001D	P.W. Board	for Music Scan	1
78	QSP0219-013	Push Switch	"	1
79	VYSR102-014	Spacer		1
80	VKS4110-002	Brake Arm		1
81	VKW4106-001	Torsion Spring		1
82	VKZ4111-001	Rubber Tire		1
83	VKL4271-001	Rubber Retainer		1
	QSS2325-011	Slide Switch	for Voltage Select KD-A22C/E/J	1
	" -011BS	"	" KD-A22B	1
	QSR0084-001	Voltage Select Switch	" KD-A22U	1
84	VKL4275-001	Bracket	for Voltage Select Switch KD-A22U	1
101	REE2000	E Ring	Brake Drum, Arm Ass'y – Gear Damp	2
102	Q03093-502	Washer	Top Cover	6
103	WNB3000N	"	Reed Switch P.W.B.	2
104	WNS2600Z	"	Brake Drum	1
105	Q03093-504	"	Shaft	1
106	DPSP4012ZS	Screw	Transformer Bracket	2
107	LPSP2604Z	"	Lug	1
108	LPSP3006ZS	"	Power Switch x 2, Voltage Selector x 2 (KD-A22U)	4
109	LDSP2604R	"	Arm Ass'y – Cassette Holder	1
110	SBSB2608Z	"	Counter	2
111	SBSB3008Z	"	Spring Bracket x 1, Gear Damp x 1, Button Spring x 3, Switch Bracket x 2	7
112	SBSB3010Z	"	Front Plate x 5, Amp Chassis x 2, Lamp Cover x 1	8
113	SBSB3012Z	"	Front Panel	4
114	SBSB3012V	"	Main P.W. Board	3
115	SDSP2608Z	"	Gear Frame	1
116	SDSP2610RS	"	Cassette Holder	1
117	SPSP3006ZS	"	M.M.S. Switch, Rec. Mute, Reed Switch	5

Ref. No.	Parts No.	Parts Name	Remarks	Q'ty
118	SPSP3006VS	Screw	Tape Select	2
119	SDSP3010R	"	Mecha Ass'y x 4, Voltage Selector x 2 (KD-A22B/C/E/J)	6
120	SDSB4090R	"	Top Cover	6
121	SPSB2608Z	"	Reef Switch (Motor)	1
122	SPSP2605Z	"	" (Muting)	1
123	SPSP2608Z	"	Reed Switch P.W.B.	2
124	VKZ4007-001	Special Screw		1

Label List

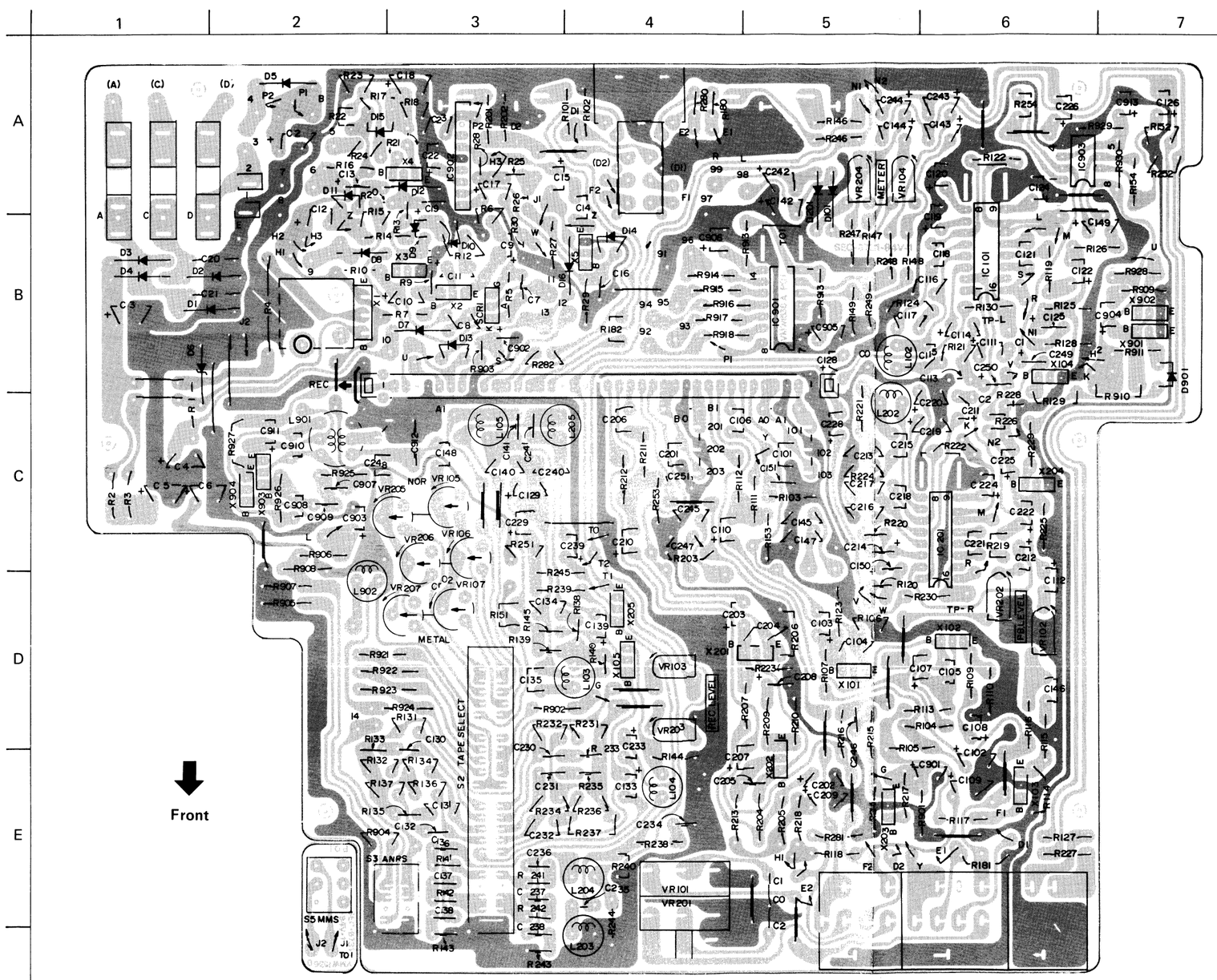
Parts No.	Parts Name	Remarks	Q'ty
VND4016-001	Metal Sticker	for Front Panel	1
VND4012-002	Head Plate	for REC/PB Head, Meta Parm	1
THS000489-02	Head Label	for E. Head, 2 Gap	1

Enclosure Assembly and Electrical Parts (Except P.W. Board Parts)

KD-A22A is not provided with voltage select switch.

KD-A22 U

P.W. Board Parts (Main amplifier)



	C. Tester			E. Voltmeter			
	E	C	B	E	C	B	
X101 X201	0.7	1.2	0.8	0.8	2.0	1.3	
X102 X202	1.4	7.4	1.2	1.4	7.8	2.0	
X103	0	0	0	0	0	0	with normal mode
X203	0	0	0.6	0	0	0.6	without normal mode
X104	0	0	0	0	0	0	without muting mode
X204	0	0	0.7	0	0	0.7	with muting mode
X105 X205	0.7	6.9	0.3	0.7	7.4	1.3	
X901	0	0.1	0.7	0	0.1	0.7	without muting mode
	0	12.0	0	0	11.6	0	with muting mode
X902	0	0.7	0.3	0	0.7	0.3	without muting mode
	0	0	0.7	0	0	0.7	with muting mode
X903	3.2	18.0	1.8	2.0	9.8	1.7	with recording mode
	19.2	19.8	19.0	19.0	19.6	19.5	without recording mode
X904	3.2	18.0	2.2	2.0	9.8	1.9	with recording mode
	19.2	19.8	19.0	19.0	19.6	19.5	without recording mode

Voltage values are measured by the following meter without input signal at playback mode.
C. Tester = Circuit Tester (20 kΩ impedance)
E. Voltmeter = Electronic Voltmeter

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
IC101 IC201	C. Tester	7.1	7.1	9.3	7.1	9.6	9.6	9.1	9.6	9.2	19.8	1.5	9.5	9.6	9.6	7.2	1.4
	E. Voltmeter	9.6	9.6	9.5	9.7	9.7	9.7	9.7	9.7	9.7	19.6	1.5	9.6	9.7	9.8	9.8	1.2
IC901	C. Tester	0.8	0.05	0.05	2.8	2.8	0	0	12.8	2.6	2.7	2.7	2.7	2.7	2.7		
	E. Voltmeter	0.5	0	0	2.7	2.7	0	0	13.9	2.6	2.6	2.6	2.6	2.6	2.9		
IC902	C. Tester	0.26	0.05	1.9	0	0	0	0	0	14.7							
	E. Voltmeter	1.9	0.5	1.9	0	0	0	0	0	14.0							
IC903	C. Tester	9.8	9.8	8.2	0	8.2	9.8	9.7	19.8								
	E. Voltmeter	9.7	9.7	9.7	0	9.7	9.7	9.7	19.4								

	X_1			X_2			X_3			X_4			SCR		
	E	C	B	E	C	B	E	C	B	E	C	B	G	A	K
C. Tester	19.8	30.2	20.3	0	19.8	0	0	0	0.7	13.2	0.3	15.0	0	30.2	0
E. Voltmeter	19.5	30.0	20.2	0	19.5	0	0	0	0.7	13.1	0.5	15.3	0	30.2	0

Main Amp. P.W. Board Parts List

⚠ parts are safety assurance parts.
When replacing those parts, make sure to use the specified one.

Ref. No.	Parts No.	Parts Name	Remarks	Q'ty
	VMW1536-102A	P.W. Board		1
R101, 201	QRD141J-683SY	C. Resistor	68 kΩ ¼ W	2
R102, 202	" -333SY	"	33 kΩ "	2
R103, 203, 119, 219, 130, 230, 229, 911	" -332SY	"	3.3 kΩ "	8
R104, 204	" -683SL	C. Resistor (Low Noise)	68 kΩ "	2
R105, 205	" -124SY	C. Resistor	120 kΩ "	2
R106, 206, 112, 212, 113, 213	" -103SY	"	10 kΩ "	6
R107, 207	" -274SL	C. Resistor (Low Noise)	270 kΩ "	2
R108, 208	QRD147J-564S	C. Resistor	560 kΩ "	2
R109, 209	QRD141J-101SY	"	100 Ω "	2
R110, 210	" -152SY	"	1.5 kΩ "	2
R111, 211	" -103SY	"	10 kΩ "	2
R114, 214	" -184SY	"	180 kΩ "	2
R115, 215	" -682SY	"	6.8 kΩ "	2
R116, 216, 121, 221	" -472SY	"	4.7 kΩ "	4
R117, 217, 238	" -273SY	"	27 kΩ "	3
R118, 218	" -222SY	"	2.2 kΩ "	2
R219	QRD143J-332S	"	3.3 kΩ "	1
R120, 220, 133, 233, 145, 13, 22	" -223S	"	22 kΩ "	7
R121, 221, 125, 225, 7	QRD141J-472SY	"	4.7 kΩ "	5
R122, 222	" -105SY	"	1 MΩ "	2
R123, 223	" -683SL	C. Resistor (Low Noise)	68 kΩ "	2
R124	" -680SY	C. Resistor	68 Ω "	1
R224	QRD143J-680S	"	68 Ω "	1
R126	QRD141J-473SY	"	47 kΩ "	1
R226, 134, 234	QRD143J-473S	"	47 kΩ "	4
R127, 227	QRD141J-151SY	"	150 Ω "	2
R128	" -104SY	"	100 kΩ "	1
R228	QRD143J-104S	"	100 kΩ "	1
R131, 231, 135, 235, 15, 20	" -683S	"	68 kΩ "	6
R132, 232	" -823S	"	82 kΩ "	2
R237	QRD141J-473SY	"	47 kΩ "	1
R137	QRD143J-473S	"	47 kΩ "	1
R138, 24	" -273S	"	27 kΩ "	2
R239	QRD141J-125SY	"	1.2 MΩ "	1
R139	QRD143J-125S	"	1.2 MΩ "	1
R140, 240	" -104S	"	100 kΩ "	2
R141, 241, 143, 243	" -101S	"	100 Ω "	4
R142, 242	" -331S	"	330 Ω "	2
R144, 244	QRD141J-152SY	"	1.5 kΩ "	2
R146, 246	" -332SY	"	3.3 kΩ "	2
R147, 247	" -681SY	"	680 Ω "	2
R148, 248, 245	" -223SY	"	22 kΩ "	2
R149, 249, 8	" -272SY	"	2.7 kΩ "	3
R150, 250	QRD143J-154SY	"	150 kΩ "	2
R151, 251, 903	" -222S	"	2.2 kΩ "	3
R153, 253	QRD141J-121SY	"	120 Ω "	2
R154, 254	" -155S	"	1.5 MΩ "	2
R152, 252	QRD143J-681S	"	680 Ω "	2
R901, 10	QRD141J-562S	"	5.6 kΩ "	2
R902	" -273SY	"	27 kΩ "	1
R904	QRD143J-561S	"	560 Ω "	1

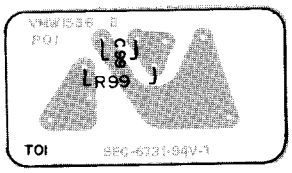
Ref. No.		Parts No.	Parts Name	Remarks	Q'ty
R905		QRD141J-392SY	C. Resistor	3.9 kΩ ¼ W	1
R906		" -104SY	"	100 kΩ "	1
R907		" -123SY	"	12 kΩ "	1
R908		" -822SY	"	8.2 kΩ "	1
R909		" -6R8SY	"	6.8 Ω "	1
R910		" -823SY	"	82 kΩ "	1
R912		QRD147J-302S	"	3 kΩ "	1
R913		QRD141J-153SY	"	15 kΩ "	1
R914–918		QRD141J-560SY	"	56 Ω "	5
R919, 920		QRD121K-821	"	820 Ω ½ W	2
R921	⚠	QRD149J-470S	U.F. Resistor	47 Ω ¼ W	1
R922	⚠	QRD126K-470	"	47 Ω ½ W	1
R923	⚠	" -151	"	150 Ω "	1
R924	⚠	QRD149J-220S	"	22 Ω ¼ W	1
R925, 926, 136, 236, 931		QRD141J-393SY	C. Resistor	39 kΩ "	5
R927	⚠	QRD149J-6R8S	U.F. Resistor	6.8 Ω "	1
R929, 930		QRD141J-683SY	C. Resistor	68 kΩ "	2
R928		" -333SY	"	33 kΩ "	1
R1	⚠	QRG019J-152	O.M.F. Resistor	1.5 kΩ "	1
R2	⚠	QRD149J-681S	U.F. Resistor	680 Ω "	1
R3	⚠	" -221S	"	220 Ω "	1
R4	⚠	QRX029J-4R7	M.F. Resistor	4.7 Ω 2 W	1
R5		QRD141J-102SY	C. Resistor	1 kΩ ¼ W	1
R6		QRD143J-103S	"	10 kΩ "	1
R9, 18		" -563S	"	56 kΩ "	2
R12		" -102S	"	1 kΩ "	1
R14		QRD141J-183SY	"	18 kΩ "	1
R16		" -103SY	"	10 kΩ "	1
R17, 21		QRD143J-273S	"	27 kΩ "	2
R19		" -151S	"	150 Ω "	1
R23		" -823S	"	82 kΩ "	1
R28		" -562S	"	5.6 kΩ "	1
R29		QRD141J-474SY	"	470 kΩ "	1
R30		QRD143J-182S	"	1.8 kΩ "	1
C101, 201, 147, 247		QCS11HJ-471	C. Capacitor	470 pF 50 V	4
C102, 202		QEB41EM-476M	E. Capacitor (Low Leak)	47 μF 25 V	2
C103, 203, 107, 207, 120, 220		QEB41EM-475M	" "	4.7 μF "	6
C104, 204, 140, 240		QCS11HK-391	C. Capacitor	390 pF 50 V	4
C105, 205		" -680	"	68 pF "	2
C106, 206, 138, 238, 146, 246, 909		QFM41HJ-103	M. Capacitor	0.01 μF "	7
C108, 208		QET41AR-107N	E. Capacitor	100 μF 10 V	2
C109, 209		QET41ER-336N	"	33 μF 25 V	2
C110, 210, 126, 226, 11		" -476N	"	47 μF "	5
C111, 211, 112, 212		QEB41EM-105M	E. Capacitor (Low Leak)	1 μF "	4
C113, 213		QFM41HK-103	M. Capacitor	0.01 μF 50 V	2
C114, 214		QET41HR-105N	E. Capacitor	1 μF "	2
C115, 215, 135, 235		QCS11HJ-201	C. Capacitor	200 pF "	4
C116, 216		QFM41HJ-102	M. Capacitor	0.001 μF "	2
C117, 217		" -273	"	0.027 μF "	2
C118, 218		" -222	"	0.0022 μF "	2
C119, 219		QEB41EM-334M	E. Capacitor (Low Leak)	0.33 μF 25 V	2
C121, 221		QFM41HJ-332	M. Capacitor	0.0033 μF 50 V	2
C122, 222		QET41HR-335N	E. Capacitor	3.3 μF "	2

Ref. No.		Parts No.	Parts Name	Remarks	Q'ty
C124, 224		QET41CR-227N	E. Capacitor	220 μF 16 V	2
C125, 225, 139, 239, 915		QET41HR-105N	"	1 μF 50 V	5
C128, 228, 133, 233, 901, 911, 10		" -475N	"	4.7 μF "	7
C129, 229		QET41ER-336N	"	33 μF 25 V	2
C130, 230		QFM41HJ-182	M. Capacitor	0.0018 μF 50 V	2
C131, 231		" -102	"	0.001 μF "	2
C132, 232		QCS11HJ-821	C. Capacitor	820 pF "	2
C134, 234		QFM41HJ-104	M. Capacitor	0.1 μF "	2
C907, 908		" -472	"	0.0047 μF "	2
C136, 236		" -562	"	0.0056 μF "	2
C137, 237		" -272	"	0.0027 μF "	2
C141, 241		QCS12HJ-201	C. Capacitor	200 pF "	2
C142, 242		QET41CR-336N	E. Capacitor	33 μF 16 V	2
C143, 243, 144, 244, 149, 249		QET41HR-105N	"	1 μF 50 V	6
C145, 245		QCS11HJ-221	C. Capacitor	220 pF "	2
C148, 248		QCS12HK-221	"	220 pF "	2
C150, 250		QET41HR-474N	E. Capacitor	0.47 μF "	2
C902, 5		QET41HR-107N	E. Capacitor	100 μF "	2
C903, 905, 906		" -106N	"	10 μF "	3
C904		QET40JR-227N	"	220 μF 6.3 V	1
C910		QFP82AJ-223	Polypropylene Capacitor	0.022 μF 100 V	1
C912		QFP82XJ-472	"	0.0047 μF	1
C913		QET41ER-336N	E. Capacitor	33 μF 25 V	1
C914		" -106N	"	10 μF "	1
C2	⚠	QET41CR-477N	"	470 μF 16 V	1
C3	⚠	QET41VR-477N	"	470 μF 35 V	1
C4		" -227N	"	220 μF "	1
C6	⚠	QET41ER-337N	"	330 μF 25 V	1
C7		QCF11HP-223	C. Capacitor	0.022 μF 50 V	1
C8		QEN41HA-105N	E. Capacitor (N. P.)	1 μF "	1
C9		QET41HR-335N	E. Capacitor	3.3 μF "	1
C12		QET41VR-336N	"	33 μF 35 V	1
C13		QET41ER-226N	"	22 μF 25 V	1
C14		QEN41EM-226N	E. Capacitor (N.P.)	22 μF "	1
C15		QEN41CA-106N	"	10 μF 10 V	1
C16		QFM41HJ-683	M. Capacitor	0.068 μF 50 V	1
C17		QCF11HP-103	E. Capacitor	0.01 μF "	1
C18		QET41CR-227N	"	220 μF 16 V	1
C19		" -476N	"	47 μF "	1
C20	⚠	QCF12HP-103	C. Capacitor	0.01 μF 50 V	1
C21	⚠	QCF12HP-103	"	0.01 μF 500 V	1
C22		QET41HR-104N	E. Capacitor	0.1 μF 50 V	1
C23		QCF11HP-103	C. Capacitor	0.01 μF "	1
C25		QCS11HK-471	"	470 pF "	1
C24		QFM41HK-472	M. Capacitor	0.0047 μF "	1
VR101		QVE5A3A-054F	V. Resistor	Rec. Level Control	1
VR102, 202		QVP8A0B-054	Semi Fixed Resistor	50 kΩ	2
VR103, 203		" -014	"	10 kΩ	2
VR104, 204		" -023	"	2 kΩ	2
VR105, 205, 106, 206, 107, 207		QVP4A0B-104	"	100 kΩ	6
D1–5, 8	⚠	10E1-B	Diode		6

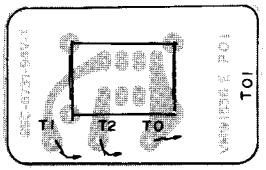
Ref. No.		Parts No.	Parts Name	Remarks	Q'ty
D6		RD20E(B3)	Zener Diode		1
D7, 9–12, 14–17		MA150	Si. Diode		9
D13, 101, 201		OA90	Ge. Diode		3
D901		RD6.8E(B3)	Zener Diode		1
R180, 280		QRD143J-102S	C. Resistor	1 kΩ ¼ W	2
R181, 281		QRD147J-182S	"	1.8 kΩ "	2
R182, 282		QRD143J-332S	"	3.3 kΩ "	2
L101, 201		TAC000493-01	Inductor		2
L102, 202, 103, 203, 105, 205		VQP0001-183	"		6
L104, 204		" -562	"		2
L901		VQH1009-012	Osc. Coil		1
L902		QVP0001-102	Inductor		1
X1	⚠	2SC1162(B,C)	Transistor		1
X2, 3		2SC1685(R,S)	"		2
X4		2SA564(R,S)	"		1
X101, 201, 102, 202, 105, 205		2SC1327(T,U)	"		6
X103, 203, 104, 204		2SC1684(R,S)	"		4
X901–904	⚠	2SC1685(R,S)	"		4
SCR1	⚠	03P05M	SCR		1
IC101, 201		AN7362N	I.C.		2
IC901		LB1436	"		1
IC902		BA335	"		1
IC903		UPC4557C	"		1
		QSSC201-101T	Slide Switch	REC/PB	1
		QSL2309-002	Lever Switch	Super ANRS	1
		QSL8409-001	"	Tape Select	1
		VMH4003-001	Heat Sink	for X1	1
		LPSP3008ZS	Screw	for Heat Sink, for X1	2
		VMJ6002-009	Pin Jack Ass'y		1
		VMJ5002-002	Jack Ass'y	Mic & HP	1
		TAZ336499-03	Volume Lug	for REC Level Control	1
		VMZ0005-001	Post Pin		5
		E43727-002	Wrapping Tab		30
		E40130-001	Tab		2
		V44611-009	Bus Wire	15 mm	1
		QWY123-019	"		27
		QSP2210-061	Push Switch	for DIN	1
		QMC09014-006	DIN Socket		1
	⚠	TAZ000331-02	Fuse Holder	KD-A22A/B/E	6
	⚠	QMF51A2-R50	Fuse	KD-A22A/E	2
	⚠	QMF51A2-R50BS	"	KD-A22B	2
	⚠	QMF51A2-R63	"	KD-A22A/E	1
	⚠	QMF51A2-A63BS	"	KD-A22B	1
		VYH4514-001	Shield Case	for L102, 202	1

Other P.W. Board Parts

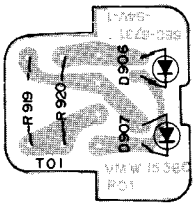
– Reed Switch –



– MMS Switch –

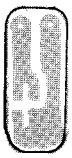


– LEDs –



– Music Scan –

– Rec Mute –



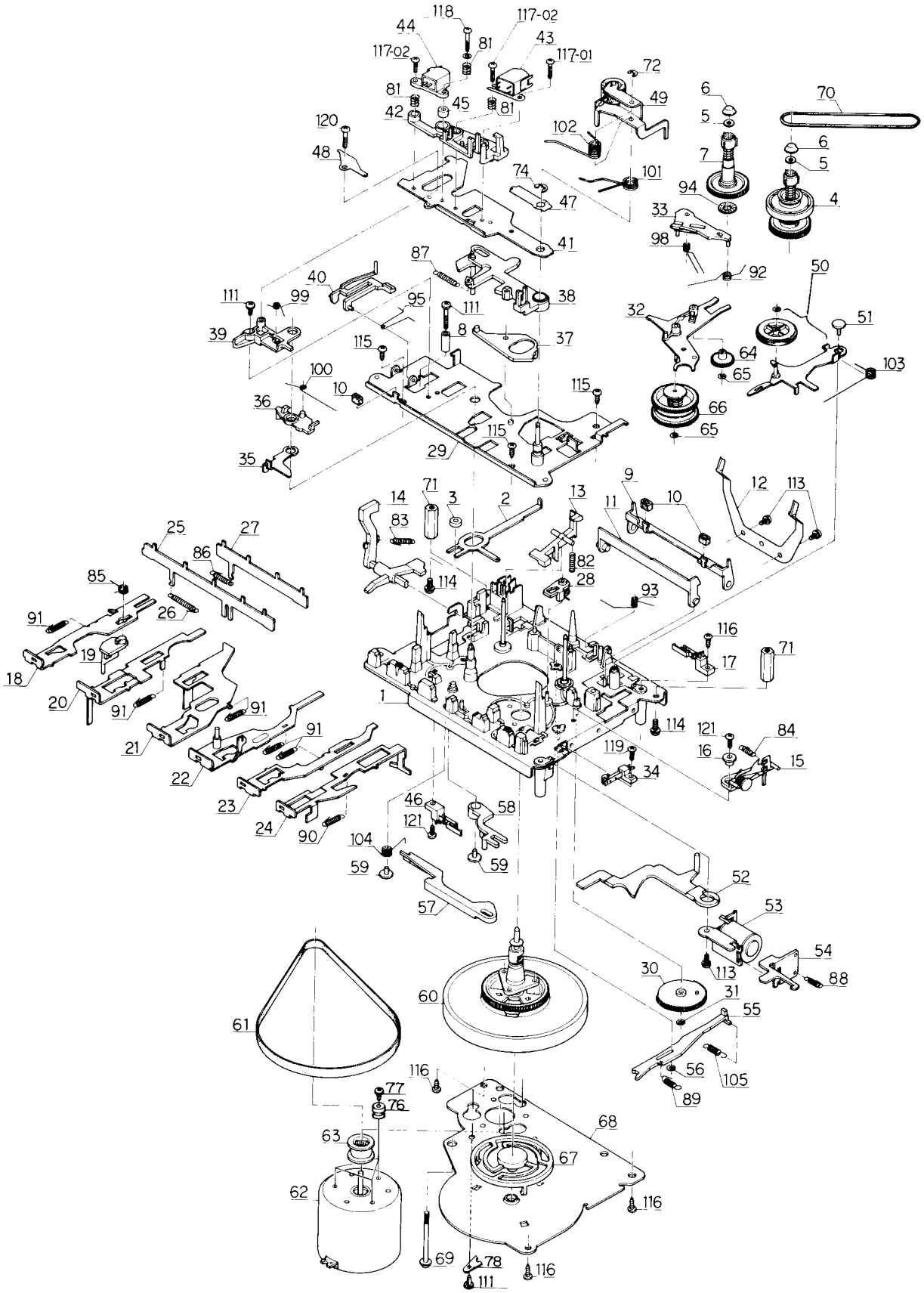
Other P.W. Board Parts List

⚠ parts are safety assurance parts.
When replacing those parts, make sure to use the specified one.

Ref. No.		Parts No.	Parts Name	Remarks	Q'ty
(Reed Switch)					
		VMW1536-102B	P.W. Board	for Reed Switch	1
		TDS271409-01	Reed Switch		1
C99		QCF11HP-223	C. Capacitor	0.022 μF 50 V	1
R99		QRD147J-182S	C. Resistor	1.8 kΩ ¼ W	1
		TER271414-01	Spacer		1
(LEDs)					
	⚠	VMW1536-102C	P.W. Board		1
	⚠	SLP-155B-01V	LED	Rec. & Super ANRS	2
		VYSA1R8-047	Spacer		1
R919, 920		QRD121K-821	C. Resistor	820 Ω ½ W	2
		VYSA1R8-046	Spacer		1
(MMS Switch)					
		VMW1536-102D	P.W. Board		1
		QSP0219-013	Push Switch	for MMS	1
(Rec Mute)					
		VMW1536-102E	P.W. Board		1
		QSL2209-003	Lever Switch	for Rec Mute	1

No. 4191

Mechanical Component Parts



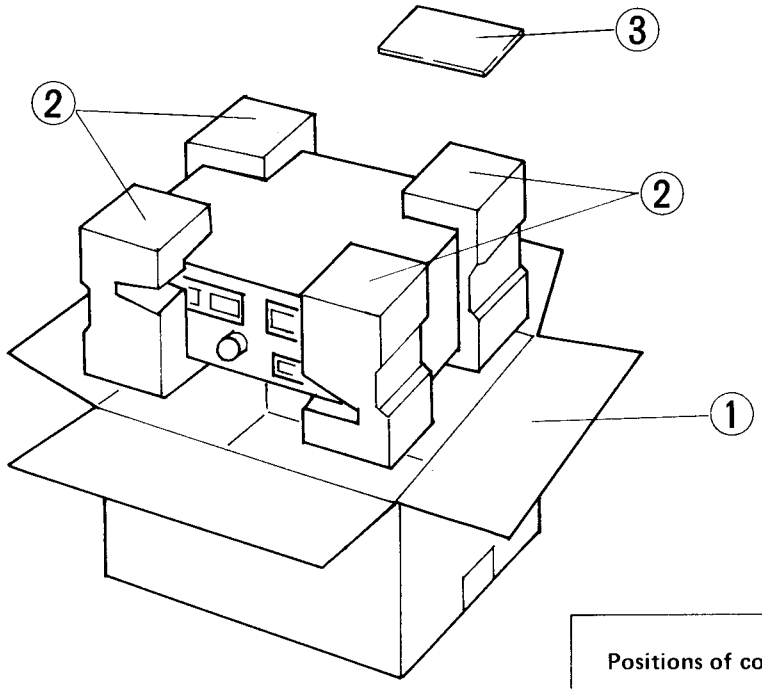
Mechanical Component Parts List

* Marks are new parts.

Ref. No.	Parts No.	Parts Name	Remarks	Q'ty
1	*VKL1171-00A	Chassis Base Ass'y		1
2	*VKL4733-001	Slide Bar	Brake	1
3	*VKS4213-001	Bushing		1
4	*VKR4165-00A	Take-up Disk Ass'y		1
5	*VKR4170-001	Ring		2
6	VKS4131-001	Reel Stopper		2
7	*VKR4172-00A	Supply Disk Ass'y		1
8	*VKH3000-036	Collar		1
9	*VKS4214-001	Brake Lever		1
10	*VKZ4137-001	Brake Rubber		2
11	*VKS4215-001	Switch Lever		1
12	*VKY4190-001	Pack Spring		1
13	*VKS4217-001	Rec. Safety		1
14	*VKS4218-001	Lock Arm		1
15	*VKS4243-00A	Pause Bracket Ass'y		1
16	*VKH3001-034	Flange Collar		1
17	*VSH1105-002	Switch		1
18	*VKL4735-001	Stop Bar		1
19	*VKS4220-001	Select Cam		1
20	*VKL4736-001	Rew. Bar		1
21	*VKL4737-002	Rec. Bar		1
22	*VKL4738-00A	Play Bar Ass'y		1
23	*VKL4740-001	F.F. Bar		1
24	*VKL4741-001	Pause Bar		1
25	*VKL4758-001	Cam		1
26	*VKW3002-049	Spring	Tension	1
27	*VKL4744-001	Sub Cam		1
28	*VKS4244-00A	Spring Holder Ass'y		1
29	*VKL3236-00A	Button Cover Ass'y		1
30	*VKR4179-001	Auto Cam		1
31	VKZ4004-001	Special Washer		1
32	*VKL3238-00A	Gear Base Ass'y		1
33	*VKS4222-001	Stopper Cover		1
34	VSH1102-001	Switch	Pause	1
35	*VKL4745-002	Lock Plate		1
36	*VKF4105-001	Rew. Lever		1
37	*VKS4224-001	F.F. Lever		1
38	*VKS3119-001	Arm		1
39	*VKS4225-00A	Arm Holder Ass'y		1
40	*VKS4239-001	Door Safety		1
41	*VKL3240-001	Head Base		1
42	*VKS3120-001	Head Mount Base		1
43	VGH0421-003	R/P. Head	VND4012-002 Meta Parm (Head Plate)	1
44	VGH0212-102	E. Head	THS000489-02 2 Gap (Head Label)	1
45	*VKH3000-035	Collar		1
46	VSH1105-001	Switch	Muting	1
47	*VKY4183-001	Spring Plate		1
48	*VKY4199-001	Pressure Plate		1
49	*VKP4109-00A	Pinch Roller Arm Ass'y		1
50	*VKL4748-00A	Take-up Idler Arm Ass'y		1
51	VKS4233-001	Lock Bush		1
52	*VKW4228-001	Select Arm		1
53	*VGP0601-002	DC Solenoid Ass'y		1
54	*VKL4746-001	Trigger		1
55	*VKS4229-002	Kick Lever		1
56	VKZ4004-001	Special Washer		1
57	*VKS4230-001	Select Bar		1
58	*VKS4257-001	SW Arm		1
59	VKS4233-001	Lock Bush		2
60	*VKF3112-00A	Flywheel Unit Ass'y		1

Ref. No.	Parts No.	Parts Name	Remarks	Q'ty
61	VKB3001-007	Belt		1
62	MMI-6B2HD	DC Motor		1
63	VKS4139-002	Motor Pulley		1
64	VKR4173-001	Rew. Gear		1
65	VKZ4004-001	Special Screw		2
66	VKR4174-00A	F.F. Gear Ass'y		1
67	*VKS4232-001	Flywheel Holder		1
68	*VKL4747-001	Flywheel Bracket		1
69	*VKZ4009-001	Special Screw		1
70	VKB3000-012	Belt	Counter	1
71	*VKH3011-003	Stud		2
72	REE2000	E Ring		1
73	VND4012-002	Head Plate	Meta Parm, for REC/PB Head	2
74	REE3000	E Ring	Pressure Plate	1
75	THS000489-02	Head Label	2 Gap for E. Head	1
76	VKZ4130-001	Cushion Rubber		3
77	VKZ4109-001	Motor Screw		3
78	TFB345469-01	Rubber Stopper		1
81	VKW3001-036	Spring	Compression for REC/PB & E. Heads	3
82	*VKW3001-050	"	Compression for REC Safety	1
83	*VKW3002-047	"	Tension for Lock Arm	1
84	*VKW3002-048	"	Tension for Pause Bracket	1
85	*VKW3002-049	"	Tension for Main Cam	1
86	*VKW3002-050	"	Tension for Sub Cam	1
87	*VKW3002-051	"	Tension for Arm	1
88	*VKW3002-052	"	Tension for DC Solenoid	1
89	*VKW3002-004	"	Tension for Kick Lever	1
90	*VKW3004-002	"	Tension for Pause Bar	1
91	*VKW3004-001	"	Tension for Play Bar x 1, Rew. Bar x 1, Rec. Bar x 1, F.F. Bar x 1, Select Cam x 1 (VKZ4139-001 = Silencer)	5
92	*VKW4228-002	"	Torsion for Stop Cover	1
93	*VKW4206-001	"	Torsion for Switch Bar	1
94	*VKZ4003-003	Clutch Felt	Back Tension	1
95	*VKW4229-001	Spring	Torsion for Door Safety	1
96	*VKW4209-001	"	Torsion for Select Cam	1
97	*VKW4210-002	"	Torsion for F.F. Bar	1
98	*VKW4211-003	"	Torsion for Stop Cover	1
99	*VKW4212-001	"	Torsion for Lock Plate	1
100	*VKW4213-002	"	Torsion for Rew. Bar	1
101	*VKW4214-002	"	Over Socket Pressure Plate	1
102	*VKW4215-001	"	Torsion Pinch Roller	1
103	*VKW4216-001	"	Torsion Idler Arm	1
104	*VKW4217-001	"	Torsion Select Bar	1
105	*VKW3005-001	"	Tension Kick Lever	1
106	VKW3001-048	"	Flywheel	1
110	SPSP2614Z	Screw	Pinch Roller Stud	1
111	LPSP2604Z	"	Arm Holder x 1, Rubber Stopper x 1	2
112	LPSP2605Z	"	Flywheel Ass'y	3
113	SPSP2604Z	"	DC Solenoid x 1, Spring Plate x 1	2
114	LPSP3006ZS	"	Stud	2
115	SBSB2606Z	"	Button Cover Ass'y	3
116	SBSB2608Z	"	Flywheel Bracket x 3, Motor Switch x 1	4
117-01	SPSP2008Z	"	E. Head	1
117-02	SPSP2010Z	"	REC/PB Head	2
118	SPSP2014Z	"	E. Head	1
119	SPSP2606Z	"	Pause Switch	1
120	SPSP2610Z	"	Pressure Plate	1
121	SPSP2604Z	"	Pause Bracket Ass'y x 1, Muting Switch x 1	2

Packing



Positions of control and switch knobs at renew packing

Power switch	:	OFF
REC level control	:	MIN
Tape select	:	SA/CrO_2
ANRS	:	ON
Mecha. operation buttons	:	OFF
Music scan	:	OFF
Counter	:	000

Packing Material List

Ref. No.	Parts No.	Parts Name	Remarks	Q'ty
①~②	**VPA3140-00C**	**Packing Case Ass'y**	**KD-A22A/B/E/J/U**	**1 set**
①~②	**" -00D**	**"**	**KD-A22C**	**1 set**
①	VPA3140-004	Case	KD-A22A/B/E/J/U	1
①	" -005	"	KD-A22C	1
②	VPH2128-001	Cushion		2
	QPGA060-06005	Envelope	for Set	1
	AP4056A-036	"	for Power Cord, Provided Cord	2
	QPGB024-03404	"	for Instruction Book	1
	TKS000501-01	Sheet	for Set	1

Accessories

Parts No.	Parts Name	Remarks	Q'ty
VMP0002-00A	PIN Cord	KD-A22A/C/J/U	2
CN-201	DIN Cord	KD-A22B/E	1
VYA4001-00A	Head Cleaning Stick		1
VNN0058-301	Instruction Book		1
BT20029B	Warranty Card	KD-A22A	1
VND4013-001	Warning Label	KD-A22A/B/E	1
T46328-003	Caution Label	KD-A22A/B	1
VPZ4001-001	Serial Ticket	KD-A22A	1
BT20013C	Guarantee Certificate	KD-A22B	1
TJL000443-01	Seal	KD-A22B	1
TJL000420-01	Label	KD-A22B	1
QZL1005-001	BEAB Label	KD-A22B	1
QZL1002-003BS	Warning Label	KD-A22B	1
VNC5004-001	Mark Sticker	KD-A22B/E	1
VPZ4001-001	Serial Ticket	KD-A22B/E/J/U	1
BXN750110UU	Microphone Guide	KD-A22B	1
BT20025C	Warranty Card	KD-A22C	1
T44362-001	CSA Marker	KD-A22C	1
TLT000505-01	UL/CSA Caution Label	KD-A22C/J	2
TLT000503-01	"	KD-A22C	1
TLT000503-02	"	KD-A22C	1
T43758-003	Serial Ticket	KD-A22C	2
T46328-004	Caution Label	KD-A22E	1
BT20032B	Warranty Card	KD-A22J/U for PX, EES	1
BT20042	Special Reply Card	KD-A22J/U for PX, EES	1
E7795-1	EP Mark	KD-A22U for PX, EES	1
V04062-001	Siemens Plug	KD-A22U	1
T46328-001	Caution Label	KD-A22U	1
VNC5311-101	Caution Card	KD-A22U for PX, EES	1
T46328-005	Caution Label	KD-A22C/J	1

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Printed in Japan
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